# SUPPLEMENT.


# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

**FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.**

[*The* MINING JOURNAL *is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.*]

No. 2527.—VOL. LIV. LONDON, SATURDAY, JANUARY 26, 1884. PRICE (WITH THE JOURNAL) SIXPENCE BY POST £1 4s. PER ANNUM.



FIRST SILVER MEDAL, ROYAL CORNWALL POLYTECHNIC —Highest Award for Effectiveness in Boring, and Economy in the Consumption of Air

JUBILEE EXHIBITION, 1882.

THE PATENT

**"CORNISH" ROCK DRILL.**

FIRST SILVER MEDAL, MINING INSTITUTE OF CORNWALL.

FIRST AWARD, BORING CONTEST DOLCOATH MINE, DECEMBER, 1881.

Prices and particulars on application to the Manufacturers

HOLMAN BROTHERS,

CAMBORNE FOUNDRY AND ENGINE WORKS, CAMBORNE, CORNWALL.

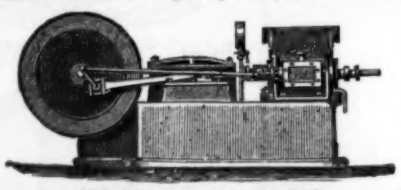
**ENGINES, AIR COMPRESSORS, TUNNELLING CARRIAGES, TRIPODS, &c., From own design, or to order.**

THE PATENT

**"ECLIPSE" ROCK-DRILL AND "RELIANCE AIR-COMPRESSOR."**

First Silver Medal awarded at Boring Competition, East Pool Mine, Sept. 1883.

PRIZE MEDAL, HIGHEST AWARD.



PARIS EXHIBITION. 1878.

ARE NOW SUPPLIED TO THE ENGLISH, FOREIGN, AND COLONIAL GOVERNMENTS And are also in use in a number of the LARGEST MINES. RAILWAYS, QUARRIES, AND HARBOUR WORKS IN GREAT BRITAIN AND ABROAD

FOR ILLUSTRATED CATALOGUE AND PRICES apply to—

**HATHORN & CO., 22, Charing Cross, London, S.W.**

THE PATENT

**"Cranston" Rock Drill,**

**AIR COMPRESSOR AND DEEP BORING MACHINERY.**

For prices, and particulars of rapid and economical work accomplished, apply to

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CAUTION TO PURCHASERS.

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MACHINES LET OUT ON HIRE, OR ON THE HIRE SYSTEM

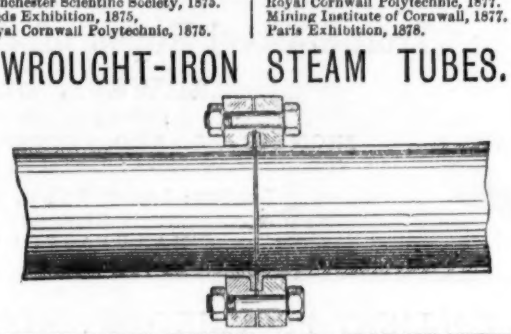
Apply, S. MASON and Co., Stone Machine Works, Leicester, England.

IMPROVED **INGERSOLL ROCK DRILL** PATENT

MEDALS AND HIGHEST AWARDS.

American Institute, 1872.
American Institute, 1873.
London International Exhibition, 1874.
Manchester Scientific Society, 1875.
Leeds Exhibition, 1875.
Royal Cornwall Polytechnic, 1875.
Rio de Janeiro Exhibition, 1875.
Australia Brisbane Exhibition, 1876.
Philadelphia Exhibition, 1876.
Royal Cornwall Polytechnic, 1877.
Mining Institute of Cornwall, 1877.
Paris Exhibition, 1878.

**WROUGHT-IRON STEAM TUBES.**



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**PERCUSSIVE ROCK PERFORATOR**

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FOR HAND-LABOUR ONLY,

**IN HARD ROCK.**

FOR MINES, QUARRIES, AND GOVERNMENT CONTRACT WORK.

RATE OF PENETRATION IN GRANITE, 1½ to 2 inches per minute.

Price £50 complete.

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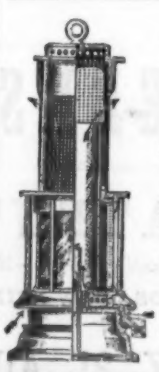
N.B.—A machine can always be seen at work (without notice) at the Albert Ironworks.

ESTABLISHED 1820.



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BIRMINGHAM.

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Medal.—For Improved Invention—London, Kensington, 1874.
Ditto—Excellence of Workmanship—Wrexham, 1867.

THE

**"Barrow" Rock Drill**

**COMPANY.**

HOSKING AND BLACKWELL'S PATENT.

The DRILLS are exceedingly STRONG, LIGHT, SIMPLE, and adapted for ends stopes, quarries, and the sinking of shafts. They can be worked by any miner

SUPPLY their CELEBRATED ROCK DRILLS, AIR COMPRESSORS, &c., and all NECESSARY APPLIANCES for working the said Drills.

Their DRILLS have most satisfactorily stood the TEST of LONG and CONTINUOUS WORK in the HARDEST KNOWN ROCK in numerous mines in Great Britain and other countries clearly proving their DURABILITY and POWER.

About 200 are now at work driving from three to six times the speed of hand labour, and at from 20 to 30 per cent. less cost per fathom. They can be worked by any miner.

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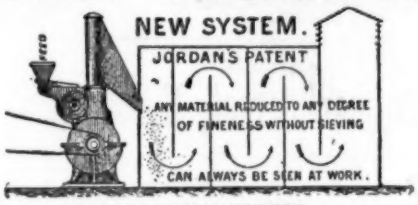
**PATENT PULVERIZER.**

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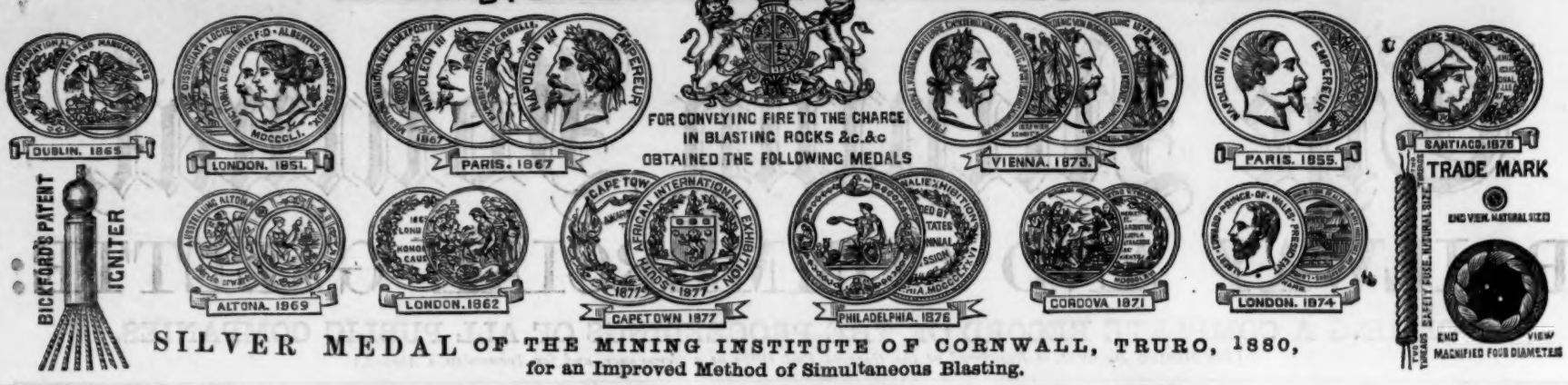
FIRST AWARD.
SYDNEY. 1879.

BICKFORD'S PATENT FUSES

FIRST AWARD.
MELBOURNE, 1881.




SILVER MEDAL OF THE MINING INSTITUTE OF CORNWALL, TRURO, 1880,
for an Improved Method of Simultaneous Blasting.

FOR SIMULTANEOUS BLASTING.

# BICKFORD, SMITH AND CO.,

THE INVENTORS, AND ORIGINAL PATENTEES AND MANUFACTURERS OF

## SAFETY AND INSTANTANEOUS FUSES AND IGNITERS

FOR USE IN ALL BLASTING OPERATIONS AND SPECIALLY PREPARED FOR ANY CLIMATE

**Note the TRADE MARK: Two Separate threads through centre of Fuse.**

BICKFORD, SMITH AND CO.'S Patent Igniters and Instantaneous Fuses for simultaneous blasting are being extensively used at home and abroad. This improved method is the cheapest, simplest, and most dependable ever introduced for simultaneously firing any number of charges. For full particulars, see Descriptive Catalogue.

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Sole Patentees of Untwisted Wire Rope.

**Iron & Steel Ropes of the highest quality for Collieries, Railways, Suspension Bridges, &c.**

PATENT STEEL FLEXIBLE ROPES AND HAWSERS.
IRON STEEL, AND COPPER CORDS. LIGHTNING CONDUCTORS.
COPPER CABLES of high Conductivity for Electric Light and Power.

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LONDON OFFICES:—
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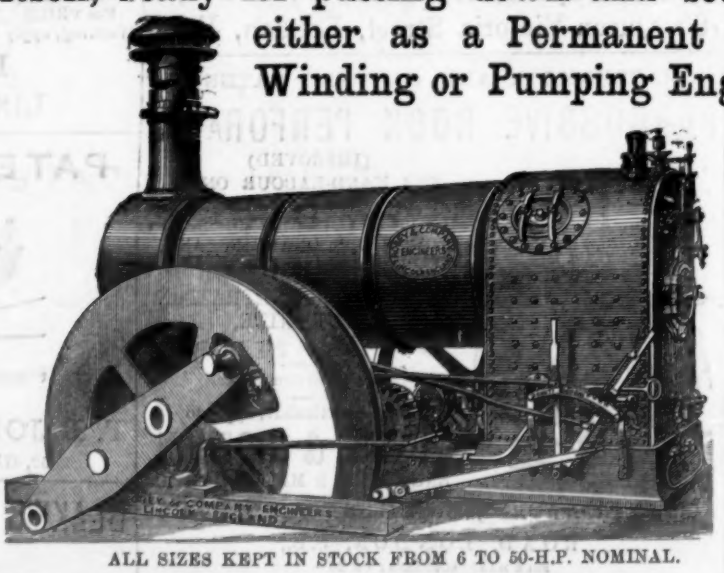
**The PATENT "ROBEY" MINING ENGINE is complete in itself, ready for putting down and setting to work, either as a Permanent or Temporary Winding or Pumping Engine.**



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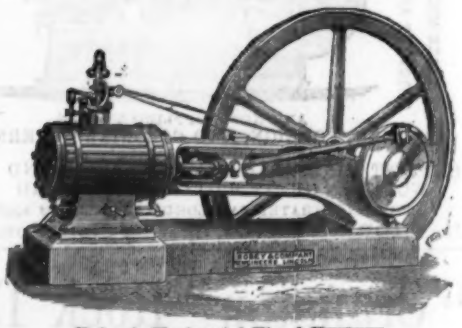
Robey's Vertical Stationary Steam Engine, 1½ to 16-h.p.

The Improved Robey Fixed Engine and Locomotive Boiler Combined, 4 to 65-h.p.

Please note this is the Original "ROBEY" Engine as designed and manufactured by Messrs. ROBEY and Co., of Lincoln. All others are mere attempts at imitation.

For particulars and prices apply to the Patentees and Sole Manufacturers—



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# ROBEY & CO., ENGINEERS, LINCOLN.

FROISETH'S NEW AND REVISED MAP FOR 1875,—Size 40 by 56 inches, scale 8 miles to the inch. Handsomely engraved, coloured in counties, showing the Towns, Settlements, Rivers, Lakes, Railroads Mining Districts, &c., throughout the Territory, and all the Government Surveys to date. Mounted on cloth, £2; half-mounted, £1 12s.; pocket form, £1.
Also, GENERAL MINING MAP OF UTAH, showing twenty-eight of the principal Mining Districts adjacent to Salt Lake City, and location of the most prominent mines. Price, pocket form, 5s.
Also, NEW MAP OF LITTLE AND BIG COTTONWOOD MINING DISTRICTS showing the location of over Four Hundred Mines and Tunnel Sites, together with the Mines Surveyed for United States Patent. Price, sheets, 5s.; pocket form, 5s.
For sale, and supplied by—
TRUBNER and Co., 57 and 59 Ludgate Hill, London.
B. A. M. FROISETH, Salt Lake City, Utah, U.S.

# THE NEW PATENT FLAX BELTING.

The Only Good Belt made of Textile Fabric.—Manufactured solely from the best Russian Flax.

SPECIALITY FOR DYNAMOS, SAW MILLS, AND MAIN DRIVING PURPOSES.

Price List and Particulars from—

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## Patent Steel Trucks, Points and Crossings,

## PORTABLE RAILWAY, STEEL BUCKETS, &c., &c.

Telephone No. 14.
*In connection with the Leeds Exchange, and all the principal Hotels and places of business in the town.*

## GILDERSOME FOUNDRY, NEAR LEEDS.

(Near Gildersome Station, G.N.R. Main Line, Bradford to Wakefield and London, via Laisterdyke and Ardsley Junctions.)

Registered Telegraphic Address:—
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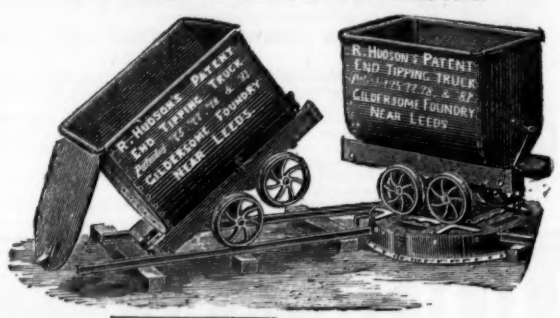
UPWARDS of 25,000 of these Trucks and Wagons have been supplied to the South African Diamond Mines; American, Spanish, Indian, and Welsh Gold, Silver, Copper, and Lead Mines; Indian and Brazilian Railways, and to Railway Contractors, Chemical Works, Brick Works, and Coal and Mineral Shippers, &c., &c., and can be made to lift off the underwork, to let down into the hold of a vessel, and easily replaced. They are also largely used in the Coal and other Mines in this country, and are the LIGHTEST, STRONGEST, and most CAPACIOUS made, infinitely stronger and lighter than wooden ones, and are all fitted with R. H.'s Patent "Rim" round top of wagons, requiring no rivets, and giving immense strength and rigidity. End and body plates are also joined on R. H.'s patent method, dispensing with angle-irons or corner plates.

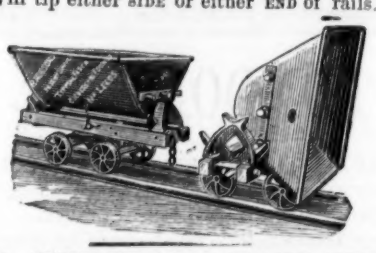
**Patented in Europe, America, Australia, India, and British South Africa, 1875, 1877, 1878, 1881, and 1883.**
**N.B.—The American, Australian, Indian, and Spanish Patents on Sale.**

### CAN BE MADE TO ANY SIZE, AND TO ANY GAUGE OF RAILS.

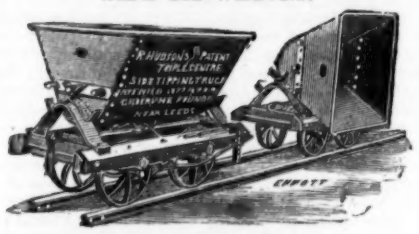
1.—PATENT STEEL END TIP WAGONS.




2. PATENT UNIVERSAL TRIPLE-CENTRE STEEL TIPPING TRUCK,
Will tip either SIDE or either END of rails.

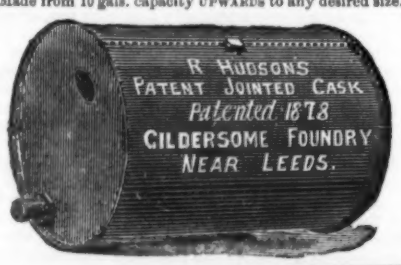


3.—PATENT TRIPLE-CENTRE STEEL SIDE TIP WAGONS.

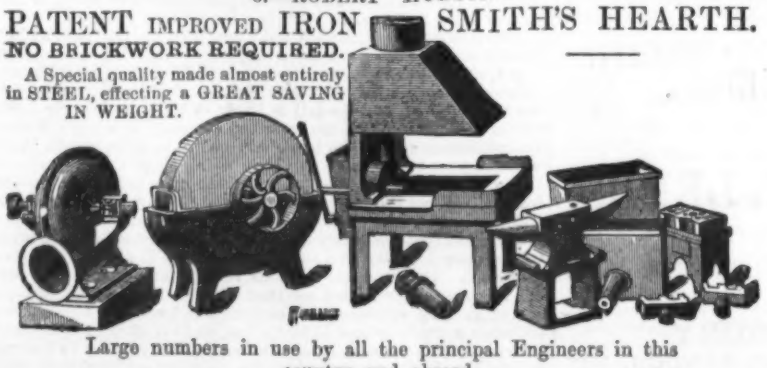


4. -PATENT STEEL PLATFORM OR SUGAR CANE WAGON.

5.—PATENT STEEL CASK.
As supplied to H.M. War Office for the late war in Egypt).
DOUBLE the STRENGTH of ordinary Casks without any INCREASE in weight.
(Made from 10 gals. capacity UPWARDS to any desired size.)



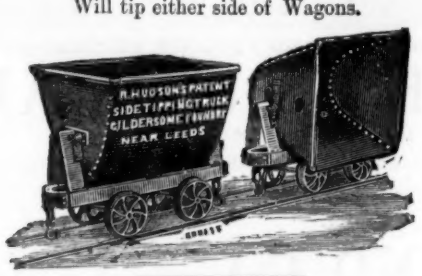

6.—ROBERT HUDSON'S
PATENT IMPROVED IRON SMITH'S HEARTH.
NO BRICKWORK REQUIRED.
A Special quality made almost entirely in STEEL, effecting a GREAT SAVING IN WEIGHT.



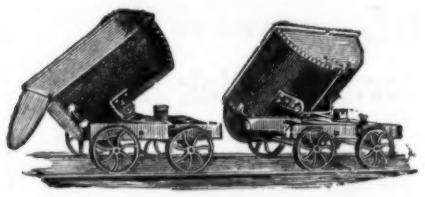
Large numbers in use by all the principal Engineers in this country and abroad.

ONE man can EASILY tip ANY WEIGHT in these wagons.

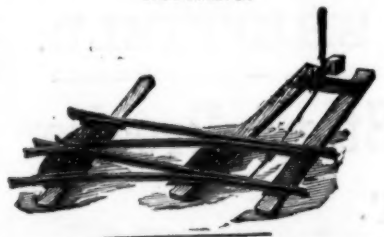
8.—PATENT DOUBLE-CENTRE STEEL SIDE TIP WAGONS,
Will tip either side of Wagons.



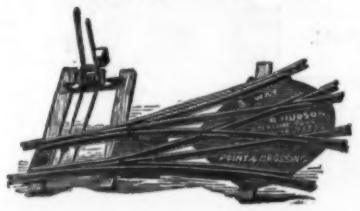

9.—PATENT STEEL ALL-ROUND TIP WAGON.



10.—LEFT-HAND STEEL POINT AND CROSSING.

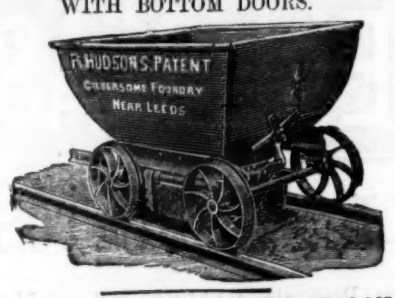


11.—RIGHT AND LEFT-HAND STEEL POINT AND CROSSING.



7.—PATENT STEEL MINING WAGONS.

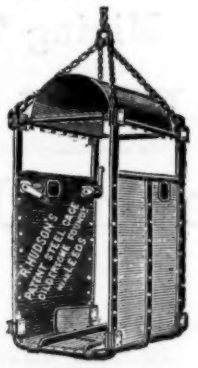
12.—PATENT STEEL HOPPER WAGON, WITH BOTTOM DOORS.




13.—PATENT STEEL HOPPER WAGON.

14.—SELF-RIGHTING STEEL TIP BUCKET.
(The "CATCH" can also be made SELF ACTING if desired.)

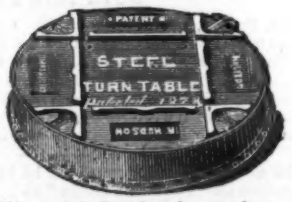
15.—STEEL CAGE.




16.—PATENT STEEL WHEELBARROWS.
Made to any Size.
Lightest and Strongest in the Market.

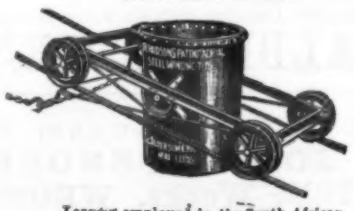
A great success.

17.—STEEL SELF-CONTAINED TURNTABLE.




(Also made in CAST Iron for use where weight is not a consideration.

18.—"AERIAL" STEEL WINDING TUB.



Largely employed in the South African Diamond Fields.

No. 19.—PATENT STEEL CHARGING BARROW,
DOUBLE the STRENGTH & much LIGHTER than ordinary Barrows

### ALL KINDS OF BOLTS NUTS, AND RIVETS MADE TO ORDER ON THE PREMISES

# BELL'S ASBESTOS.

**BELL'S PATENT ASBESTOS BLOCK PACKING,** for High Pressure Engines. This Packing has been specially designed to overcome the difficulties experienced by engineers and others in the practical working of engines of the most modern type of construction. The greatly increased skill and workmanship now obtained in the construction of engines and boilers have led to a rapid increase in the working pressure, the object being the attainment of a high rate of speed combined with economical working, the practical advantage of which, however, cannot be realised unless the Packings are so constructed as to avoid stoppages for the purpose of re-packing the stuffing boxes. It is now a recognised fact that the most perfect heat-resisting material suitable for the purpose of a Packing is Asbestos, but to ensure a successful application of this fibre, great skill is required in manufacture. In this Packing the Asbestos is woven into a stout cloth, and owing to the peculiar way in which it is manipulated, great elasticity is imparted to the Packing. This Packing has met with the most unqualified approval wherever it has been used, and on being taken out after about twelve months, working at 70 lb. pressure, it has been found to be in a perfect state of preservation, and was therefore replaced. The Patent Block Packing is square, as Fig. 1, and Figs. 2 and 3 represent the Round Block Packing with solid and hollow rubber core, and Fig. 4 without core, but with rubber inlaid. An Engineer writes as follows:—"The Asbestos Block Packing works splendidly. I have never seen its equal. We keep our gland nuts so that you can move them with finger and thumb, and can maintain a constant vacuum of 23½ in." As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears my trade mark.

**BELL'S ASBESTOS BOILER PRESERVATIVE.** This useful mixture by absorbing the free oxygen that is in the water entirely checks pitting and corrosion. It also disintegrates incrustation so immediately as to prevent its adhering to the plates. Not only is a great economy of fuel effected by keeping boilers clean, but the risk of having the plates burned is thereby obviated. It has been computed that ⅛ in. thick of incrustation causes a waste of 15 per cent. of coal; ¼ in., 60 per cent.; ½ in., 150 per cent. Thus the Preservative avoids the great risks which are inseparable from scaled plates, lengthens the life of a boiler, and covers its own cost a hundred-fold by economy of fuel. It is entirely harmless, and has no injurious action on metals. It can be put into the feed tank or boiler, as may be most convenient. Sold in drums and casks bearing the Trade Mark, without which none is genuine.

**BELL'S ASBESTOS YARN and SOAPSTONE PACKING**

for Locomotives, and all Stationary Engines running at very high speed with intense friction.

The following Testimonial refers to this Packing:—

Festiniog Railway, Locomotive Superintendent's Office,
Portmadoc, January 13, 1883.

Mr. John Bell, 118, Southwark-street, S.E.

DEAR SIR,

I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed, better than we expected. We have a locomotive packed with it, which has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting Packing. The Asbestos Yarn we find is very useful, and answers admirably.

Yours truly,
(Signed) W. WILLIAMS.

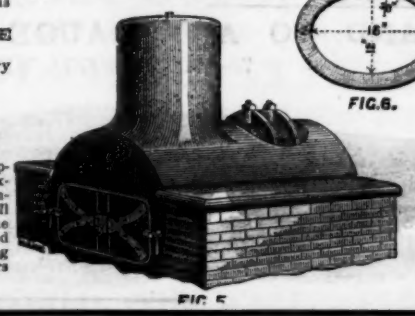


FIG. 5

TRADE MARK.

The goods of this house are of the highest quality only, and no attempt is made to compete with other manufacturers by the supply of inferior materials at low prices. All orders must be sent direct to the undermentioned depôts and not through Agents or Factors.

**BELL'S ASBESTOS BOILER AND PIPE COVERING COMPOSITION,** for coating every class of steam pipes and boilers, non-combustible and easily applied when steam is up; adheres to metals and preserves them from rust; prevents the unequal expansion and contraction of boilers exposed to weather; covers 50 per cent. more surface than any other coating, and is absolutely indestructible. It can be stripped off after many years' use, mixed up with 20 per cent. of fresh, and applied again. The composition is supplied dry, and is only to be mixed with water to the consistency required for use.

A Horizontal Boiler, 17 ft. 6 in. long, 15-H.P., gave the following results:—

Temperature on Plates - - - 186 deg.
" " Covering - - 94 deg.

One ton of coal was saved per week, and although the fire was raked out every evening, 20 lbs. of steam were found in the boiler next morning.

The following Testimonial refers to this Covering:—

Offices of the Wimbledon Local Board, Wimbledon,
Nov. 28th, 1883.

DEAR SIR,—It may interest you to know that we save exactly 40 per cent. in fuel through using your covering.—Yours truly, W. SANTO CRIMP, C.E., F.G.S.

**BELL'S ASBESTOS and INDIA-RUBBER WOVEN TAPE and SHEETING,** for making every class of Steam and Water Joints. It can be bent by hand to the form required without puckering, and is especially useful in making joints of manhole and mudhole doors; also for large "still" joints where boiling fat and steam have to be resisted. It is kept in stock in rolls of 100 ft., from ⅛ in. (Fig. 6) to 3 in. wide, and any thickness from 1/16 in. upwards. Manhole covers can be lifted many times before the renewal of the jointing material is necessary. The same material is made up into sheets about 40 in. square, and each sheet bears the Trade Mark, without which none is genuine. It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with these inferior articles at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears the Trade Mark.

FIG. 6.

FIG. 1.

FIG. 2.

FIG. 4.

FIG. 3

**BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOARD,** for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toughness and purity, and is absolutely free from the injurious ingredients frequently used to attain an appearance of finish, regardless of the real utility of the material. Made in sheets measuring about 40 in. square, from 1-64th in. to 1 in., and ½ millimetre to 25 millimetres thick. Each sheet bears the Trade Mark.

**BELL'S ASBESTOS EXPANSION SHEETING (PATENT).**

This Sheeting is another combination of Asbestos with India-rubber, giving to the steam user the special advantages of both materials.

The India-rubber Washer is protected from the action of heat and grease by an outer coating of vulcanised Asbestos Cloth, thus producing an excellent joint where expansion and contraction render other materials unserviceable.

This material is admirably suited to steam pipe joints and every class of valve.

Valves made of this material are very durable, as they are not subject to injury by oil.

# BELL'S "ASBESTOS LUBRICANT."

ILLUSTRATED PRICED CATALOGUE FREE ON APPLICATION TO

## BELL'S ASBESTOS WORKS, SOUTHWARK, LONDON, S. E.

OR THE DEPOTS—

Victoria Buildings, Deansgate, MANCHESTER. 11 and 13, St. Vincent Place, GLASGOW. 39, Mount Stuart Square, CARDIFF. 21, Ritter Strasse, BERLIN.

ESTABLISHED 1852.

## SYBRY, SEARLS, AND CO.,

MANUFACTURERS OF THE

## CELEBRATED MINING STEEL, BRANDED SSS

**Cast Steel, Shear, Blister, Spring, Hammer, and Pick Steel.**

## Special Rock Drill Steel.

**Mining Tools, Files, Saws, Hammers, and Picks.**

## CANNON STEEL WORKS, SHEFFIELD.

# The Only Knapping Motion Stone Breaker and Ore Crusher.

**AWARDED THE ONLY SILVER MEDAL FOR MECHANICAL EXHIBITS AT THE ROYAL CORNWALL POLYTECHNIC SOCIETY, FALMOUTH, SEPT., 1881.**

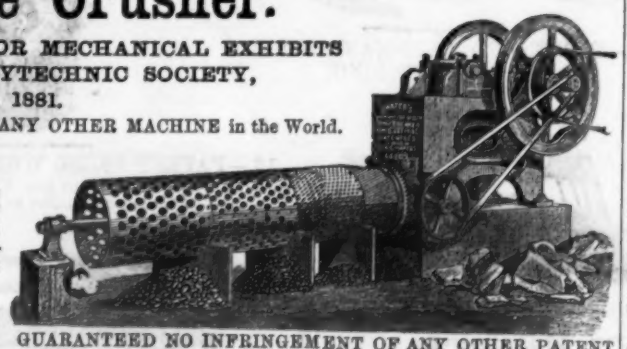
UARANTEED to do MORE WORK with less power THAN ANY OTHER MACHINE in the World. NOTE THIS FACT.

To Mr. Baxter, Leeds. *Cinderford, Feb.* 13, 1883.

DEAR SIR,—I am pleased to be able to tell you that the Machine works splendidly. We are breaking 16 trucks a day now, and we thought it a good day's work to do 10 a day with the old Machine, so you can see the difference. I had a gentleman looking at it yesterday, and he was surprised to see it work so easily.

Yours truly, E. ORGAN.

The above refers to one of our 16 by 9 Machines we supplied to replace an "Improved Blake" 15 by 9 Machine.



GUARANTEED NO INFRINGEMENT OF ANY OTHER PATENT

AWARDED THE ROYAL MANCHESTER, LIVERPOOL, AND NORTH LANCASHIRE AGRICULTURAL SOCIETY'S SILVER MEDAL, 8TH OF SEPTEMBER, 1882.

FOR ILLUSTRATED CATALOGUE AND FULL PARTICULARS ADDRESS TO THE PATENTEES AND SOLE MAKERS,

## W. H. BAXTER & CO., ALBION STREET, LEEDS.

SILVER MEDAL (HIGHEST AWARD) MELBOURNE, 1881.

## TUBES

JOHN SPENCER,

Globe Tube Works, WEDNESBURY,

AND 3, QUEEN STREET PLACE, CANNON STREET, LONDON, E.C.

FIRST PRIZE, SYDNEY, 1880.

TUBES AND FITTINGS for Gas, Steam, and Water; Galvanised, Enamelled, and Hydraulic Tubes; Boiler Tubes and Fittings; Gas Fitters' Tools; Brass Cocks, &c.

ANTI-CORRODO TUBES AND FITTINGS COATED BY BARFF'S RUSTLESS PROCESS.


## FOREIGN MINING AND METALLURGY.

The French Iron Trade appears to have become quite disorganised, and iron has not brought much more than 6*l.* 4*s.* per ton. Ironmasters in the Nord are struggling bravely on, but it is difficult for them to do so in presence of the prices at which new contracts are being taken. The Steelworks Company of France has just concluded a contract for 11,000 tons of steel rails at 7*l.* per ton, delivered in Corsica. This contract, the terms of which are equivalent to about 6*l.* per ton at the works, has been given out by the French Departmental Railways Company. In the Longwy group the stocks held amount to nearly 100,000 tons, so that the situation must be described as far from favourable. The German iron trade is still depressed, although some branches of business are pretty well sustained. The steelworks, for instance, are well employed. German industrials had been hoping to secure contracts for about 36,000 tons of steel rails for Italian lines. One lot of 12,840 tons was obtained by Krupp, of Essen; but John Cockerill Company secured a second lot of 11,156 tons; while a third lot of 11,890 tons was awarded to Messrs. Geisser and Company, of Turin. The export of rails from Germany in the first eleven months of last year attained the following importance:—Russia, 1300 tons; United States, 6335 tons; Austria and Hungary, 13,954 tons; Italy, 20,607 tons; Great Britain, 3899 tons; and other countries, 51,520 tons. The corresponding exports in the corresponding period of 1882 were:—Russia, 468 tons; United States, 9425 tons; Austria and Hungary, 14,167 tons; Italy, 33,043 tons; Great Britain, 4026 tons; and other countries, 42,501 tons.

The Belgian Iron Trade has shown no improvement. The demand has remained restricted, while offers are considerable, so that prices present, upon the whole, a bad tone. During the past week there has been, perhaps, a slight revival in the demand, as small customers have been giving out orders; but prices have still shown weakness. The Athus-Halanzy group has officially launched a tariff of 2*l.* 2*s.* 6*d.* per ton for No. 5 pig. Refining pig has continued neglected; the production cannot be disposed of, and the stock is increasing, not very largely, perhaps, but still in a continuous fashion. A quotation of 2*l.* 2*s.* per ton is now freely admitted; this rate has, of course, brought ordinary pig down to 1*l.* 18*s.* per ton, and mixed pig to 1*l.* 14*s.* per ton. No. 1 iron has continued at 4*l.* 16*s.* per ton upon the Belgian markets, with a difference of 6*s.* per ton per number; this has brought No. 2 down to 5*l.* 2*s.* per ton, and No. 3 to 5*l.* 8*s.* per ton. Girders have been maintained in Belgium at 5*l.* 2*s.* per ton, but without much firmness. No. 2 plates have brought 6*l.* 12*s.* per ton; No. 3, 7*l.* 8*s.* per ton; and plates of commerce, 9*l.* per ton. The John Cockerill Company has obtained a contract for iron required in the construction of the new Belgian Palais de la Nation, or Parliament House. A mineral map of the Luxembourg has just been prepared, under the direction of M. Willière. The production of rails effected last year by the Angleur Steelworks Company was 23,000 tons; this total was a smaller one than had been anticipated, the reduction being due to a fire which occurred at the company's works, Aug. 31, 1882. The profits realised by the company in 1882-3 amounted to 8373*l.*, after providing for all fixed charges.

The weather has continued mild and open in Belgium, and coal-owners are, of course, not too well pleased with this state of things. The spring does not present itself under brilliant auspices this year in Belgium, every day brings nearer the period of the year when prices usually give way, and the fall is likely to be a particularly difficult one in 1844, since prices are sustained generally to a large extent by the quotations current for household coal. In other words, the fall will this year be a graver one than usual, since the general condition of metallurgical industry has become more and more discouraging. It will not do, however, to take too gloomy a view of matters, and it is only fair to observe that existing stocks present no great importance, that the current extraction is disposed of without any very serious difficulty, and that prices are still at a relatively favourable level. The Couchant-de-Mons remains in a pretty good state, and appears to be suffering less than other districts from the approach of spring. The movement of combustible over the Belgian State Railways appears to be still increasing, and satisfaction is expressed at the promptitude with which deliveries are made. In the week ending Jan. 13 the number of trucks carrying coal and coke which passed over the system was 19,000; the corresponding number in the corresponding week of 1883 was 18,848. The German coal trade has shown no material change. Household coal and the best descrip-

tion of industrial coal have been maintained with firmness; but coke has been comparatively neglected. The extraction of coal in the Sarrebruck district continues considerable; it amounted in December to 495,879 tons, as compared with 496,348 tons in December 1882.

## Original Correspondence.

### INDIAN CONSOLIDATED AND INDIAN GLENROCK GOLD MINES.

SIR,—I have recently made a very urgent personal and written representation to the directors of the above companies with reference to their withholding from the shareholders the agent's reports they receive from the mines each mail. My argument is that we (the shareholders) are entitled to know everything the directors know, and as that information would be published gratuitously in the *Mining Journal*, their not affording the information is a want of duty and respect to the shareholders. I found from personal interviews with the officials that the policy of both boards was identical on above point, and the letters I have just received from the secretaries conveying the directors' reply to my request confirms that opinion. Those replies are most unsatisfactory. They are to the effect that it is not the wish of the majority of the shareholders that the information directors receive continually should be published. That the information is trivial, and not conveying any useful information. That the publishing of the reports might encourage speculation (that I was told personally), and, lastly, and what I consider impertinence to country shareholders, that the information in question may be obtained by calling at the office. How are we country shareholders to call at the office?

Business men too do not like writing continually to probably much bothered secretaries on every possible ground. Whatever the directors learn from mines, whether much or little, good or bad news should at once be conveyed to shareholders through the Press. Your paper and others as suitable, would willingly publish the same; all first class mines do so. My object in troubling you is to urge on my fellow shareholders in this gigantic failure the urgent need of impressing on the directors their desire not to be kept in the dark for months as to what is doing at these mines where such immense sums are so sadly invested. JOHN GRIFFITHS.

*Fareham, Jan.* 21.

### GOLD FIELDS OF THE TRANSVAAL.

SIR,—As a growing interest has been awakened in these regions, reliable information respecting them is specially seasonable at the present time, Mr. W. M. Dick, a Natal colonist of about 40 years standing, a gentleman well acquainted by travel with the Transvaal and its leading men and native races, has sent the following interesting letter, which shows that there is abundance of gold, and also that its existence there has been known for centuries. He says:—

"The New Gold Fields of South Africa" is a decided misnomer, as I am pretty certain they are among the earliest worked in the world. We know that the Queen of Ethopia—Sheba or Saba—brought great wealth with her from this part of the continent to Solomon. We know that Egypt, containing no gold within its bounds, drew her wealth from the interior. But further evidence of the fact, which existed in comparatively modern times, was lost, or, at least by the great mass of the public, forgotten.

In 1869 at a book sale I picked up a very large atlas, by Tavernier, geographer to His Most Christian Majesty Louis XV. The maps folded out in some instances to the size of 6 ft. by 4 ft. Africa was in two of these, and on looking at the southern half I was surprised to find the countries lately described in the best maps as unexplored divided into districts, and the chiefs' names and villages marked. Spots were marked "gold" and tinted yellow, the rivers in many instances correctly laid down, by, it is plainly said, the Jesuit missionaries of 300 years ago; and—tell it not in London near the offices of the R. G. S.—the lakes which have gained such kudos to travellers of late, I found laid plainly down. I was puzzled at first by the longitude, till I remembered that the travellers, being Portuguese fathers, probably made their calculations from the meridian of Teneriffe. This I found to be the case. The district now called "The South African Gold Fields" is called in that map the country of Monomatampa—which, I am informed by Sir T. Shepstone, means "The Land of the Mines," or "He of the Mines." The atlas containing these maps is in the possession of my friend, Mr. J. W. Winter, late M.L.C. for this city. A tracing on transparent cloth made by myself is possessed by Sir Theophilus.

Shortly after this some attention was given to the reports of Mauch and other travellers, when the Chevalier Duprat, then Portuguese Charge d'Affaires for British South Africa, said in my hearing, "Yes, there is gold there. We have known it and got gold from it for hundreds of years." I was struck by this, and naturally thought that the mines would be exhausted, until I was in the country itself, and from an old Portuguese trader heard a description of how they got it. Time has no value to a native. The land easily produces the necessaries of life. The women do all the labour. The chief is absolute master of the life and limb of every soul of his tribe, the headman of his kraal, and the husband and father of his numerous wives and children. The trader had beads and cloth, rum, and other things the savage delights in. The chief ordered each headman to bring so many quills filled with gold, and the headman told his kraal, and they set their wives and children to get it. They washed and picked the sand and gravel, and the quills were filled. The natives have for ages worked in metal. One tribe, to the north of the Monomatampa Country, has been famous for untold generations for smelting and working in iron, principally spears and hatchets of rude appearance, but sharp and effective, of capital metal, and sometimes elaborately ornamented in barbaric taste.

About 1875 a party of Australian diggers came over resolved to give the place a try, and in July, 1876, I met at Newcastle, our most northern town, a digger returning thence. When he arrived, and before he went to Mr. Kidd's store, he was a rough moleskin-trousered and narrow-belted man—a Scotchman, I could hear, but travel teaches people to keep their curiosity under. On his return, and after dinner, while we smoked under the verandah of the hotel, the Australian suddenly asked me if I hailed from Glasgow. I said no, but from Kilmarnock. He said he thought he had seen me before. He had been a junior clerk in the old Western Bank, doing part of the liquidation matter, and was a native of Dunoon. His name was Lochhead. He was satisfied, he said.

About two months afterwards I was about 45 miles from Pretoria, on the main road, and having had some talk one day with the leading merchant (then), Mr. Lys, he said gold was distributed all over, and as he spoke his son, Godfrey—now studying for the law here, but then a lad—went out with a quill tube to the water furrow flowing through the street, and in about an hour returned with some specks—very fine, but there was no mistake about what it was. Mr. Lys said that it was so distributed that he was afraid it would not pay to extract, except they got at the main seam, as he called it.

Just about Nov. 24, and two days before Capt. Aylward came up from Kimberley with his volunteers for the Sekukuni war (a smart lot they were), a wagon, accompanied by three diggers, arrived and placed in the Commercial Bank 800 lbs. weight of gold from the party to which Lochhead belonged, for transmission to the Natal Bank. This was loaded up on Dec. 2 on the wagon of Mr. Duncan M'Kenzie, of Fort Nottingham, and by him brought down to this city. This gold I saw. It was in nuggets and coarse, gravelly-looking pieces, coated with black as if it had been blackened.

Between Lydenburg and the Berg, old workings have been found with drives in them and pieces of iron tools, decidedly not native, probably of Portuguese or Arabic origin. The Portuguese here are from Goa, in India. In one of these workings, at the bottom of a shaft, some 20 ft. from the surface, was found growing a large mimosa tree, evidently of great age. As I was saying, about 45 miles from Pretoria, one day travelling in the mail cart, we outspanned—that is, unharnessed—the mules to let them feed and rest for an hour. A seam of reddish-coloured quartz crossed the road just there, so I took the small hatchet or pickaxe, generally carried with these conveyances, and by dint of sheer hammering got a bit about half the size of my fist, and perhaps 1¼ lb. weight. No gold or traces of it were visible, but a fellow passenger told me that it was the true gold-bearing quartz. I put it in my pocket, and on arriving back at Pretoria I took it to the "smiddy" of Mr. Samuel Jenkins, blacksmith and wagonmaker, and he permitted me to roast the piece of quartz on his fire. After cooling, it was pounded in a mortar by Mr. John Wyman (late of Challoner's Apothecaries' Hall, Durham, and then of the firm of Brodrick and Wyman, merchants, Pretoria), and some mercury put therein and rolled about in it. The mercury took a distinct tinge of gold, although no speck or grain was visible in the quartz. That is all I know about digging personally.

But the picture has its reverse side. The settlement—or, rather, treaty entered into after the defeat at Amajuba—while it retains to the Crown of Great Britain the suzeraina did not retain the seignoral rights of a superior power. And Uncle Paul's errand at home now is to get quit of even that. No possession or even lordship is retained, and the Boer is owner of his land—to use the words of an old Scottish writer—as high as heaven and as deep as ——, and he knows that a rush of diggers means the beginning of the end of his dream of the rule of himself over the black population. It is extremely difficult to obtain leave to prospect, and the Government does not seem inclined to assist. Therefore individual effort is not to be thought of, and many men, utter adventurers, are now in England with title deeds and diagrams of farms, trying to raise companies or dispose of these El Dorados. I know some of them. One was at home lately, a man hailing from a northern town of our own country. He sold gold-bearing land over which he had merely a grazing title. This man is really an escaped convict from the convict prison at Grahamstown, Easter Province, Cape of Good Hope. Another still with you is a man who has changed his name so often that he hardly knows it himself. He has been in most prisons in South-east Africa, accused of most crimes, from murder downwards. A third I managed to have arrested in concert with a friend, and that friend holds security for his return to abide the trial of a heavy issue. He is a man who, in a strictly moral living land, would be scouted from society. As ugly as sin, he is worse than Brigham Young—a very satyr.

Of course, there are *bona fide* companies, and one, I believe possesses a respectable directorate, and large capital in London and Durban. But of all these little speculators beware. These gold-bearing farm hawkers possess papers and diagrams, but they are often ideal pictures of a right to a farm in a certain district after survey—and possibly there is more land granted in the district than it contains—so the position is problematical and the time of possession exceedingly so. I am told that in Australia a digger paying a license can dig anywhere by paying damages for injury caused to the surface proprietor. This is as it should be. Many years ago, Chief Justice Harding told me that he considered the titles of the settlers of the Republican States to be simply squatters or grazing rights as the grants here are. Poor gentleman! He fortunately did not live to see these very squatters defeat and slay a scientific English general with a party of her best troops, and sending the survivors of these troops down a hill in five minutes that it took them three hours to get up.

You will say that I write as a renegade. Not so. I write in very bitterness of spirit. You annexed a land peacefully under certain promises and hunted down the Republican flag, replacing it with the meteor flag of England. You sent the modern Bombastes Furioso to declare that that flag would fly there as long as the sun was in the firmament. You promised them their constitutional liberty as formerly, only the Queen was to be the Queen. You delayed and shuffled away until the official through whom you promised these things remonstrated, and your *Ferere*brand came, and Sir T. retired, and a coloured man was put in his place, a very Rehoboam, whose ormolu haughty conduct roused the spirit of the rugged Boer, which, fanned by continental adventurers, burst forth, and the result is known—the British prestige lost for ever in this land.

The truth is, the annexation was conducted with tact, and by one who knew the people and their temper. On his retirement the West Indian thought they were dolts, and used them as such. The fact is, the Transvaal never should have been seized; but, once seized, it was false to British nature and traditions, it was false to the English settlers in South Africa, it was false to the honour of the Queen and the army to surrender it in the hour of defeat, caused by the ignorance or presumption of a single man, however high his theoretical attainments might be. But gold being found there will, I have no doubt, attract a body of free and enlightened citizens, who will take charge of the elections and ballot boxes, and teach the Boers election tactics. I trust you will not consider the above lengthy and racy communication of Mr. Dick unworthy of a place in your valuable Journal. He has something to say, and says it well and fearlessly.

*Llanrwst, Jan.* 23. A. F.

### OPHIR AND RUSH VALLEY MINING DISTRICTS—No. II.

#### THE LEADING MINES IN OPHIR.

SIR,—The Hidden Treasure group, owned in Philadelphia, consists of the Hidden Treasure and East Extension, Sacramento, Cedar, Summit, Western, and Dyke. In the Hidden Treasure Company's mines the ore occurs in large bodies to a depth of 600 ft. on the line of contact between the slate and limestone; at a depth of 600 ft. the vein cuts through the limestone, running towards the great porphyry dyke, with which said dyke the formation of the orebody is more or less in connection. The vein is opened on an incline to a depth of 1400 ft., and on the strike by thousands of feet of drifts and levels. A tunnel cuts the vein at a depth of 600 ft. Another tunnel, which is already 1350 ft. long, will tap the vein at a depth of 1700 feet. The vein dips at an inclination of 34° northerly. The ore averages 24 ozs. of silver and 40 to 55 per cent. lead per ton. From the mine a tramway 1200 ft. long leads down to the wagon-road. These mines have produced enormous quantites of ore. The Chicago work on the same orebody as the Hidden Treasure is very largely developed, and has produced in past years large quantities of excellent ores. Each of the aforesaid mines has a smelter—the Watermann and the Chicago, situated 9 miles distant on the Rush Lake, to work their ores.

The Kearsarge, owned by Sam Connor and Co.; vein 2 ft. to 5 ft. wide, developed to a depth of 900 feet. Developed on the strike by 1800 ft. of drifts and levels. Vein dips at an inclination of 25°. The character of ore is chloride of silver, tellurium, and hornsilver, assaying from $60 to thousands of dollars in silver per ton. The mine is developed by an incline, from which runs an east and west branch incline to a depth of over 800 ft.; this mine has produced very rich ore in the past, and is a valuable property.

Queen of the Hills, Flavilla, and Herschal, developed by an incline, and thousands of feet in length of drifts and levels to a depth of over 1300 ft.; vein 2 to 5 ft. wide; assay value of the ore 40 to 130 ozs. silver, and 40 to 54 per cent. of lead. Has produced large quantities of good ore.

The Deseret, Shoo Fly, Thad. Stevens, Eureka, Miners' Delight, Gray Rock, California Bay, Mahogany, Sunny Side, Mountain Tiger, Monarch, Silver Chief, Zella, Struck It, San Jaoquim, Green Chloride, Great Western, Chrisopolis, Fourth of July, Magnolia, Jim Fisk, Green-eyed Monster, Chloride Gem, Mountain Gem, and Miama are all mines largely developed, having produced good ore in paying quantities.

Amongst the other prominent mines of Ophir district, both in regard to development and production, we have the Shamrock, Boston Pet, Hattie Evans, Aristotle, Saint Louis, Utah Queen, Converse, Rockwell, Tiger, Elgin, Brooklyn, Grey Eagle, Vesta, Noyes, Henrietta, Trafalgar, Sevier, Cooley, Wandering Jew, Crusader, Red Pine, Pocohontas, Poor Man, Last Chance, Plymouth Rock, Wild Delirium, Burnett, Bannock, Indicator, Silver Treasure, German, Home Stake, Lily Rose, Bechtel, Roland, Blue Rock, Rattler, Galena, Buckhorn, Stephen A. Douglas, I.X.L., Grecian Bend, Etna, Monument, Swansea, Northern Light, Accident, Ivanhoe, American Flag Ira, Jennie, Azure Queen, Emilie, Pine Grove, Empire, Belfast, Trace, Banner, Russian, Arabella, Selah, Dixie, Moylan, and Gas Light.

The principal mines in Rush Valley district are—First National, Honerine, Great Basin, Quandary and Quandary No. 2 developed to a depth of 900 ft., and on the strike for a distance of over 2000 ft. by drifts, levels, inclines, and shafts in the aggregate about 26,000 ft. long. These mines work in two parallel true fissure veins, bearing east and westerly, with a dip at an angle of inclination of from 60° to 80° northerly. These two veins unite to one large mother lode at a depth of from 350 to 400 ft. Large quantities of ore have been and are soon to be extracted from these mines. The assay value of the ore is 18 to 69 ozs. silver, 30 to 70 per cent. lead, and a trace to $5 in gold.

Attached to the above said mines are concentrating, leaching, and smelting works of a large capacity.

Silver King Nos. 1 and 2 and Southport Mines developed to a depth of 500 ft. by numerous inclines, drifts, levels, and stopes, disclosing large quantities of low grade ores. These mines have produced considerable quantities of good ore.

Lion No. 2 and Extension Vein 3 to 26 ft. wide. Assay value of the ore 29 to 70 ozs. of silver, 50 to 70 per cent. lead, and a trace to $3 in gold per ton, developed to a depth of over 500 ft., on an incline by numerous extensive inclines, stopes, tunnels, levels, and drifts, has and is producing considerable quantities of good ore.

The King of Stocton, Muscatine, Centennial, New Year, Atkins, Iroquois, Hannah, Calumet, Sentinel work on three parallel veins 2 to 5 ft. wide; they are well developed, have and are producing a fine quality of ore in paying quantities.

Prominent in development and as good ore producers amongst the other mines of Rush Valley district are—The Vulcan, Hecla, Alps, Saint Patrick, Silver Crown, Defiance, Silver Queen, Katherina, Mervin, Manzanilla, Minerva, Montezuma, Bullion, No You Don't, Elizabeth, Emerald, Melia, Theresa, Clara, Leonore, Argenta, Protector, Metropolitan, Daniel Webster, Globe, Legal Tender, War Eagle, Commodore, Chaco, and Wade Hampton Mines.

W. BREDEMEYER, M.E., U.S. Surveyor.

*Salt Lake, City, Dec.* 26.

### MINERAL WEALTH OF COLORADO.

SIR,—As will be seen in the following statement, furnished by the Denver journals, the mining product of Colorado for the year 1883—gold, silver, copper, and lead—amounted to $26,306,151, a small increase over the previous year:—Boulder, $400,000; Chaffee, $300,000; Crester, $800,721; Clear Creek, $2,000,000; Dolores, $200,000; Eagle, $930,000; Fremont, $20,000; Gilpin, $2,208,988; Grand, $10,000; Gunnison, $650,000; Hinsdale, $390,000; Lake (Leadville), $15,691,200; La Plata, $128,688; Ouray, $700,600; Park, $400,000; Pitkin, $125,000; Rio Grande, $182,000; Routt, $75,000; Saquache, $100,000; San Miguel, $225,000; San Juan, $418,954; Summit, $350,000.

The amount credited to Leadville is somewhat less than the production of 1882; but that is mainly owing to the reduction in the price of lead. A year ago it was selling for $90 per ton; but towards the close of the year it was dull at $72. The lead production of the year showed an increase for the whole State of about 10,000 tons, the figures for 1882 being 55,000, against 65,000 for 1883, Leadville furnishing the greatest quantity, and in 1882 the output of that camp was 39,864 tons, and for 1883 it must have been slightly in excess of those figures, as the Iron Silver Mine alone shipped 25,000 tons, and the Silver Cord, adjoining, at least 8000, and since the beginning of the year, however, business generally has improved, and lead has already advanced $8 per ton, with an upward tendency, which will greatly encourage the working of those silver mines in Leadville and Colorado generally, whose products also contain a large percentage of lead.

The prospects for the current year are very flattering. The older mining camps are keeping up their usual output, and the new districts of the San Juan country—Ouray, Red Mountain, Telluride, Silverton, and others—show a great increase over corresponding periods of previous years. Capitalists, both English and American, are investing considerable sums in good mining property all over the State, and new discoveries are of frequent occurrence. The outlook for the year is, therefore, very encouraging.

The gross earnings of the Denver and Rio Grande Railway for 1883 show an increase over the previous year of $1,038,301, a result which must be quite gratifying to all those interested in the prosperity of the road.—*Denver, Colorado, Jan.* 8. J. FITZ BRIND.

### SUCCESS THE MOST SATISFACTORY CRITERION OF JUDICIOUS INVESTMENTS IN MINING.

SIR,—In view of the imposing array of figures which appear from time to time in the *Mining Journal* setting forth the enormous profits of so many foreign gold and silver mines one is led to enquire how it is that English investors participate in so few of them. Is it not that British capitalists and investors are lacking in true spirit of enterprise, and permit others to do for them, but first for themselves always, what they in their own interest should have performed. The rich strikes of the precious metals remunerate largely, and are frequently met with, but not always at comparatively early stages of development. The fortunate owners of such enterprises are usually more than content with their success, and do not invite others to a share of their prosperity, until at length they perceive some signs of decadence, and a falling off of values. It is then that their spirit of enterprise seeks a new channel for its exercise, and moves upon the lines and under the auspices of its recent and not yet absolutely exhausted success, for the purpose, if possible, of achieving another success, but entirely from different sources—that is having extracted, or all but extracted—the kernel they set about endeavouring to realise an almost equivalent value for the shell. It is only mines of such class and flagrantly arrogant pretensions and others of equally doubtful character which in a large majority of instances are offered for sale outright as surpassingly genuine dividend-paying properties. The eminently good mines—as long as they continue so—are usually amply self-sufficing; that is, they fully satisfy the expectations and rational desires of their owners.

It has always appeared to me an anomaly that mining properties should be credited in appaisement of present or future values with what had been extracted therefrom, which frequently amounts to hundreds of thousands, and in some instances to millions, of pounds sterling. A mining property must certainly be disproportioned and depreciated in its intrinsic value to the extent of the amount of wealth previously extracted from it just as if the presumption was unquestionable that the greater the amount which had been extracted the greater was that which remained to extract. Is there any reason why the earlier as well as the later products should not more frequently fall to the lot of British enterprise, especially when one of their aphorisms is in respect of mining that "there are as good fish in the sea as has ever been taken out of it," which is true as a figure of speech to the purpose intended, more particularly when applied to newly-discovered rich mineral-bearing countries, there is no reason that I am aware of why such should not be the case, except it be that the spirit which should animate and prompt the necessary measures does not exist or is fettered by prejudice, and rendered inoperative from the absence of reflection. The proverbial astuteness of Englishmen does not, it appears to me, very prominently or creditably figure in this arena, especially in respect of foreign enterprise.

Nothing can be easier to realise, inferentially as well as in fact, than that the great prizes in mining accrue to those who prosecute with perseverance the earlier developments. The animating factor of all investments is the prospects more or less assured of compensating profits. New mines are not now in one sense only but in every sense, in the fullness and fruition of their values, as well as in the labour and expense of their development, the products of which—well-selected enterprises—at comparatively early stages very frequently more than a hundredfold exceed the outlay involved in their establishment and equipment. Their first cost as compared with that of acquiring properties of such value subsequently is almost infinitesimal. Of course it will be understood that I am treating of foreign mining in new localities in this country, and the chances next to certainties of realising vast wealth with but little, if any, risk of loss whatever. It is morally assured that what will become the most highly appreciated mining properties when experience shall have

inculcated its stern lesson of facts are now almost wholly neglected, and wealth which would gladden the hearts and replenish the pockets of many repining and almost despairing adventurer is doomed to lie dormant, undeveloped, and unrealised, through ignorant prejudice of natural laws and their affinities, and because she has not poured out on her lap the treasures which by priority of right and reason she retains in her bosom. ROBT. KNAPP.

*Ione, Nye County, Nevada, Dec.* 31.

## GOLD AMALGAMATORS.

SIR,—Be good enough to afford me space in which to thank Mr. F. Kensington for the drawing and description of his gold amalgamator which appeared in the Journal of July 7 last. The machine appears to me to be admirably adapted for continuous amalgamation—that is, to receive the pulp as it flows from the stamps. Settlers and the other forms of amalgamators can be used in continuation if found necessary; but there is no doubt but that a large proportion of the gold can be saved, at small cost, by using machines such as Mr. Kensington's. The more automatic any machine, or set of machinery, is made, the more satisfactory it will work.—*Organos Gold Mines' Oct.* 30. JAMES G. GREEN.

## GOLD AMALGAMATION.

SIR,—I should not reply to Mr. Henry Moon's uncourteous attack on me in the Journal of last week, only that he makes some rather crooked assertions. 1. I did not "abuse" him in my letter of Dec. 15. 2. I did not "make light" of his amalgamator; for I did not then, and do not now, know exactly what it is. 3. I never gave anybody the slightest ground for supposing that the Britten-Readwin amalgamating pan was my own invention. Its very name proves this. My patent was for improvements on Britten's invention whereby it was made much more durable, and, therefore, more economically useful. 4. I did not in my letter quote "a lot of *ites, ates, evites, ogens,* and *ides* too numerous to mention," with a view of "throwing learned dust into the eyes of the public in the view of throwing them off the scent after truth in this very simple process of extracting gold from quartz" (*sic*). Truly the extraction of gold from pure quartz is simple enough in half-a-hundred ways. But that's not the point in question.

Mr. Moon used the chemical term *sulphate* for sulphide more than once, and in the "scent" after scientific truth this misnomer required correction. I certainly did not make use of the abortions "evites" and "ogens," as he forcibly alleges; for I never saw or heard the like of them until to-day, in his letter; and I have to confess that I do not know what they mean. 5. I did not, in 1881 or at any other time, tell Mr. Moon that "a piece of gold of the size of a small pea on the outside of a piece of quartz had all been produced spontaneously in 14 days," as he asserts. I recollect our interview quite well; and so does he, evidently. I showed him, I dare say, a spontaneous sprout or "growth" of gold more than half-an-inch long, the outcome of a comparatively short number of years, and I may also have told him that I had known of a gold growth of an eighth of an inch in length, within the space of 14 days. I did not show that to him, for it had grown off some months previously. It was fact, nevertheless; and belief or non-belief in it by Mr. Moon is of no earthly importance, inasmuch as gold growth has nothing whatever to do with gold amalgamation, the point at issue.

6. Mr. Moon might, I think, have hesitated half-a-minute before he accused me by implication of saying that "metals cannot be separated from the matrix, or from each other!" To say so would, as he says, be "an insult to common sense." He might have stretched the idea to its extremity, and have said that it would be an insult to nonsense. 7. I have never said that my process of extracting gold by quicksilver amalgamation would obtain the ultimate particle; but I have very often during the enfilade on this question said the contrary; and say so again, to oblige Mr. Moon. He goes in for the ultimate particle, I do not; because I think the game not worth the candle, and that if I succeeded in getting it, it would not be worth having. 8. I did not accept Mr. Moon's challenge to a competitive trial, and I am not aware that anybody else did. He demanded of me with more imperiousness than politeness an implicit belief in what seemed to me to border on the impossible. Besides, I did not then, nor do I now think it impossible for a plan to be devised superior to my own. Candidly, I did not think Mr. Moon's was.

On the other hand, I have repeatedly said that that is the best process which gets out the most gold, at the least cost, in the least time, and that he who goes in for the ultimate particle (as per fire assay), will never get it. I firmly adhere to this notion. Mr. Moon says he has got it. So be it. His own words are—"I can secure it" (the gold) "to the last particle, no matter with what it may be in combination!" "I can work all these" (sulphides, *&c.*), "and as many more as he" (*i. e.* myself) "likes to find, or invent," and to get the last particle of gold out of the ore, and I will use nothing but pure mercury in my simple amalgamation to accomplish this!"

Mr. Moon says further (of still greater moment, if fact)—"I can treat 20 tons of ore in 24 hours, at a cost for half-horse power to drive it, and a few pence for oil!" It is not easy to look this confident assertion steadily in the face; for beyond it nobody, I think, can go. Mr. Moon has no ambiguity about it; and it ought not to be difficult of proof. Mr. Moon seems to take a pseudomorphous sort of delight in stoning me; Æsop's frogs shall find my retort. Frankly I may say that I like my own plan of amalgamation very well; but I am not a bigot, nor do I wish it to be a hoarding for Mr. Moon to advertise on. I cannot do the like of Mr. Moon's professions, and if he can accomplish the desideratum with ordinary quicksilver I, for one, in my own interest, will heartily congratulate him; for if he will license to me the use of his apparatus I shall be enabled to make a decent fortune at home in a twinkling, and he will become, in the immediate future, abroad, rich enough to throw far into the shadows all the millionaires of the present. *Q. E. D.* Mr. Moon seems to have "shot Niagara; now then," as Carlyle said, "for the After."—*London, Jan.* 21. T. A. READWIN, F.G.S.

## TRADE OF THE UNITED KINGDOM, 1883.—No. II.

Imports of gold arranged in the order of their importance:—From Australasia, 2,256,128*l.*; France, 1,272,397; Holland, 1,126,686; Mexico, West Indies, *&c.*, 685,461; Spain and Canaries, 455,028; Belgium, 452,957; British Possessions, South Africa, 438,517; China, 193,552; British East Indies, 191,747; Germany, 157,496; Brazil, 131,541; West Coast of Africa, 95,092; Portugal, Azores, and Madeira, 80,513; Egypt, 68,496; Gibraltar, 22,532; United States of America, 9777; Malta, 9368; Sweden, 7215; Japan, 5591; British North America, 1522; other countries not enumerated, 71,693. Total, 7,733,309*l.*

Imports of silver:—From Mexico, West Indies, *&c.*, 3,787,881*l.*; United States of America, 2,803,543; France, 2,069,628; Germany, 289,563; British East Indies, 79,911; West Coast of Africa, 65,680; China, 57,179; Brazil, 42,653; Spain and Canaries, 37,985; Australasia, 33,135; Belgium, 27,244; Egypt, 26,860; Gibraltar, 21,628; Holland, 19,395; British North America, 3472; Malta, 2108; Japan, 1904; Portugal, Azores, and Madeira, 1708; British Possessions, South Africa, 1015; Sweden, 65; other countries unenumerated, 95,257. Total, 9,468,902*l.*

Exports of gold:—To Mexico, *&c.*, 1,226,560*l.*; Portugal, *&c.*, 950,640; United States of America, 937,515; British East Indies, 935,079; Egypt, 889,900; Holland, 854,542; Spain and Canaries, 501,850; Brazil, 275,718; Germany, 189,018; France, 101,234; Russia, 40,000; West Coast of Africa, 37,932; Malta, 15,040; Belgium, 5842; British North America, 500; Australasia, 390; other countries, 139,605. Total, 7,091,365*l.*

Exports of silver:—To British East Indies, 6,107,422*l.*; Spain and Canaries, 1,186,815; China, 917,552; Germany, 283,800; Mexico, *&c.*, 226,527; France, 188,915; Holland, 106,921; Australasia, 87,800; British North America, 63,106; West Coast of Africa, 49,166; United States of America, 48,550; Portugal, *&c.*, 18,975; British Possessions, South Africa, 11,300; Egypt, 7680; Japan, 5000; Malta, 1830; Brazil, 877; Belgium, 402; Gibraltar, 285; Sweden, 220; other countries, 9603. Total, 9,322,846*l.*

Grand totals of gold and silver imports, 17,201,311*l.* Exports, 16,414,211. Query, the true value of these items in the astounding business transactions of British imports and exports, in relation to their declared value of 763,101,198*l.*

The foodstuff, *&c.*, imported:—The enumerated articles, arranged in the order of their importance as to declared value, expressed in thousands of pounds sterling:—Corn, 67,040*l.*; sugar, 24,931; living animals, 11,979; tea, 11,760; butter and butterine, 11,755; bacon, 8178; coffee, 4914; wine, 5460; cheese, 4883; rice, 3180; tobacco, 2909; beef, 2878; eggs, 2728; lard, 2240; meat, 1863; hams, 1823; cured fish, 1773; spirits, 1743; oranges and lemons, 1706; potatoes, 1585; currants, 1410; hops, 1064; raisins, 1050; spices, 1044; pork, 759; cocoa, 755; yeast, 730; fresh mutton, 699; poultry and game, 591; molasses, 154; chicory, 78. Total, 184,000,000*l.*!

Quantities of certain articles of imported merchandise (subject to the duties of customs) remaining in the bonded warehouses, Dec. 31, 1883. Tea, 125,039,475 lbs.; tobacco, 86,342,076 lbs.; coffee, 59,788,736 lbs.; dried fruits, 57,563,968 lbs.; chicory, 2,120,944 lbs.; spirits, 12,878,562 gallons; wines, 8,722,557 gallons. Free Traders and Protectionists, both, might do worse than ponder over these startling items regarding imported foodstuff, *&c.*

*Brixton.* T. A. READWIN, F.G.S.

## PROTECTION, AND THE TIN TRADE.

SIR,—It is a pity this question cannot be discussed without unfair inferences; still nothing unpleasant may be intended, and it is well to put the best construction on all matters. I am glad to find that on one point, at all events, there is perfect agreement between "Reciprocity" and myself—that he hopes he is altogether wrong in his calculations. In my own mind I have not a doubt on the subject, and on carefully studying the whole question I am convinced that "Reciprocity" will arrive at a precisely similar conclusion. At any rate, I do most solemnly protest that my faith in Free Trade principles is greater and greater as years pass on, and whether I regard myself in the light of a consumer or a producer I am equally pleased with the great Free Trade movement. COMMON SENSE.

## GEOLOGICAL JOKE BY AN OLD FOSSIL.

SIR,—I belong to a numerous and very old family—in fact, one of the oldest. We don't visit in modern society, though some of the younger branches resided in "Devonia," and visited friends in the neighbourhood, but the people they met there got very mixed—the "Sauriens" with their cousins the "Pygopterus" intruded themselves upon them, talked of what an important place the locality was becoming, and even hinted their intention of going into "Coal," so that we altogether withdrew from what we considered "secondary" society.

But though we don't visit or receive a great many visitors, especially from the "Bimanas," who live in the "Quartenary"—which may be another name for Belgravia for all I know—a great many of our visitors are very nice fellows, especially F.G.S., F.R.G.S., and C.E. Bimana, their cousin Jack, is not a bad sort of fellow, still he don't know much of our family; but, take them altogether, they are civil nice people, and never say anything about us or our friends, unless they are pretty sure they are correct; but some others who say they are related are very different; they usually call after the others are gone, and give themselves airs, especially M.E. and C.M.E., Bimana. I am told that these initials which they place after their names are not their proper ones; they have merely adopted them to conceal who they really are, but be that as it may they are a conceited ignorant pair, who talk incessantly about what they know of my neighbours. Not long since one of them pretended he knew the "Sulphides" and "Sulphates," but, dear me, how he confounded the two. It was clear he thought it grand to talk about these people, but anyone could see he had no acquaintance with them, or he would not have said such foolish things about their property.

M.E. and C.M.E. are just now mad about the "Golds," who are first-class people, very silent, and make but few friends and associates; however, these few stick fast to them. M.E. and C.M.E. are trying hard to get them to live with them, but somehow or other they don't succeed very well; the only friend they have to help them is old "Mercury." He and the Golds have always been friendly, and a bad day it was for them when Bimana took up with the old fellow. He has acted as a go-between, and has certainly been successful in introducing many of his friends (the "Golds") into the houses of M.E. and C.M.E., "Bimana."

But the "Sulphides," "Arsenides," "Bismuthides," and "Tellurides" still have a great influence with the "Golds," and as old "Mercury" don't at all care for them or their society he seldom visits where they are, or if he does he gets sulky and walks away, and leaves the "Golds" to enjoy the society of their friends. He did try to make himself more agreeable when Young Wave Plate was with him, and some do say one of the Miss Golds was on the point of eloping with one or the other; but from what I know of these people and the fact that there is no business in their composition I think it most unlikely.

The other day M.E. wrote and said the children of Miss Gold, who married Young "Sulphur," were all christened "Sulphates," but there, what does he know about it? Why the lot he means were called "Sulphides." I expect he referred to their cousins, whose father, the sourest old fellow you ever met, was called "Oxygen-Sulphur." They are a very obstinate family. I wonder M.E. did not know them.

I know something about the families—old "Mundic," "Pyrrholine," "Chalcopyrite," "Stibnite," and Miss Pickel—who are mixed up with the "Golds." M.E. and C.M.E., together with old Mercury, have been trying hard to get them to come and visit them, but have met with a polite refusal. Old Mercury picked up a new acquaintance the other day, a nice kind of fellow enough, but too giddy and volatile. It is said that these two together have flirted a great deal with the Golds and their friends, though I believe it is all over now; at all events, nothing is expected to come of it, though I think it may come about again when old Mercury gets his friend to put a little more polish on him, and the doctors can prevent the "sickness" and ill-health that often comes over him.

My old friend "Brachiopoda" came to see me the other day, and we talked the matter over; he told me a lot about both M.E. and C.M.E. My friend had been in India, and had seen much of them during the last three years. They talked just as big and silly out there—pretended, as they do here, to be intimate with the Golds; but it turned out they did not even know where they lived. C.M.E. said he was sure they lived at Mugeroo, M.E. said it was all over the country, while another with the same initials, but related to Cousin Jack, said he was quite sure they lived at Dunnygrood, and said also that he had seen their house 1000 ft. long and 50 ft. broad there; but he certainly never was admitted inside, although he stopped in the neighbourhood a long while, and though urged by his friends to send some of the little Golds to them he never succeeded in making their acquaintance, and people who know all about it said long ago, and still stick to it, that the Golds never lived there at all. This same Zimana has since then been to the North of Europe, and has written saying he has found that the Golds live there in greater numbers than he ever saw before. I wonder if his friends will believe him after the curious mistake he made about their big house at Dunnygrood.

Friend Brachiopoda says there were some of the Bimana family out in India that did know where the Golds lived, and said the moment they saw the place they were sure the family did not live there, though there might be one or two stragglers found here and there. At this M.E. and C.M.E. were very cross and insulting, so that the respectable members of the family left, but the ignorance and false statements of those two fellows have long been exposed. I wonder if they will ever be believed again. I suppose they will though, as a lot of their friends live in Londinii Urbs, and it appears they don't care much whether the Golds are found at home or not, so long as they can get people to believe they know where they live.

Well, times are altered. I don't keep any servants now, but if I did I should look out for honest and truthful ones, as well as those who knew their business, and if I sent them to fetch something I should not expect them to shout "Eureka" till they had found what they went for. I hope M.E. and C.M.E. will read this, and refrain in future from writing on subjects they know nothing about, and when they go abroad remember that though they may deceive their family they cannot take in an— OLD TRILOBITE.

*Silurian-place, Jan.* 22.

## HULL AND BARNSLEY RAILWAY (HUDDERSFIELD AND HALIFAX EXTENSION, 1882).

SIR,—Notwithstanding the explicit statements made in the company's circular to their proprietors of Dec. 31, 1883, I found soon after the issue of the allotment letters of the Four per Cent. Preference stock that considerable doubts still existed, and were expressed in various quarters as to the probable attitude of the Midland Railway Company towards the Hull and Barnsley Company in respect of the proposed extension of their system to Huddersfield and Halifax. I, therefore, sought permission from Mr. Thompson, the Chairman of the Midland Railway Company, to make public his letter to me, upon which the statements in the company's circular (above alluded to) were based. This permission I have now received, and I beg to hand you herewith copy of the letter referred to. It will be seen that this letter is in reply to an enquiry from me made some weeks before the issue of the company's advertisements and circulars, and with the distinct object of obtaining the information necessary to set at rest all doubts upon the subject. GERARD SMITH.

*Hull, Jan.* 23.

Midland Railway, 28, Great George-street, Westminster, S.W., Nov. 22, 1883.

DEAR COL. SMITH,—I have received your letter of yesterday, and have no hesitation in giving you an assurance that when the Midland Company made the Parliamentary agreement with the Hull and Barnsley Company they did so with the full intention, which they still retain, of exercising their running powers to Huddersfield and Halifax upon completion of the railway. When your arrangements are sufficiently advanced Mr. Noble will be prepared to confer with your officers as to the necessary station accommodation for this company, and also as to any practicable arrangements for working the traffic of both companies, as between Cudworth and Huddersfield and Halifax, harmoniously and economically. I hope your efforts to place the capital for this portion of your undertaking may be successful.—Believe me, truly yours, (Signed) M. W. THOMPSON.

## CAUSE OF ACCIDENTS THROUGH BREAKAGE OF WINDING-ROPES.

Sir,—In last week's *Mining Journal* I notice another serious accident caused by the breaking of a wire rope at Garnat Colliery, and also another on Jan. 21 at Ince Hall Colliery. I am sorry to say these accidents are becoming painfully frequent, and must ultimately lead to a Government enquiry into the class of material used in the manufacture of wire ropes, and the adoption of a scale of tests similar to that used by the Government in their own purchase of this class of manufacture. I have been a user and buyer of wire ropes for some years, and having a fair knowledge of what a rope should be; I have been much exercised of late by the number of qualities and great differences of prices charged by the different rope makers, for what after all must be practically one and the same material. With the assistance of a friend of great practical knowledge in the manufacture of steel I have been enabled to collect a few facts that may be of service to my rope buying brethren, subject to correction by any wire rope manufacturer. From a price-list before me I will take the different qualities and quotations for a 3 in. circumference round wire rope. Charcoal wire of special quality, 20*l.* per ton; homo or Bessemer steel, special quality, 19*l.*; crucible steel wire, special quality, 31*l.*; patent steel wire, special quality, 35*l.*; improved patent steel wire, 41*l.*; patent plough wire, 66*l.*; improved patent plough wire, 72*l.* Rope to be made of six strands, seven wires to each strand, and hemp main heart.

At different times I am favoured with calls by gentlemen representing the different manufacturing houses, and taking the above quoted prices as a standpoint, I find a difference ranging from 10*l.* to 20*l.* per ton, no two firms quoting alike. On expressing surprise, I am given the most extraordinary explanations, No. 1 asserting that his house is the only one that can make a reliable wire rope, No. 2 claiming a special lay or twist, No. 3 engages a special steel maker and a special wire drawer, No. 4 a new and patented class of machinery, and so on *ad infinitum*; whereas, the fact is, there are no specialities claimed by one maker that cannot be obtained by another. I believe the entire trade is worked by rule of thumb, and the order given to each representative is to get the best price he can.

Returning to the quotations—1. Charcoal wire. I am told by most makers that charcoal wire is scarcely ever used, mild Siemens-Martin still taking its place. Assuming this to be correct, I fancy the latter material is by far the best, provided the wire is rolled and drawn down from special ingots. A 3-inch cir. rope takes a No. 12 gauge wire.—Siemens-Martin Steel Wire: Special qualities of this wire can be bought at 16*l.* per ton, and taking the rope at 20*l.* per ton we have as follows:—Cost of making rope, loss, rents, *&c.*, 40*s.* per ton; average carriage for delivering the rope, 25*s.* per ton; discount of payment of account at 2½ per cent., 10*s.* per ton; travelling expenses, *&c.*, at 5 per cent., 20*s.* per ton; profit and loss account, at 10 per cent., 40*s.* per ton: total, 6*l.* 15*s.* Add this amount to the 16*l.* charged for the wire, and we have 22*l.* 15*s.* It will naturally be asked, how is this difference made up? A Scotch firm of manufacturers advertise as follows:—"When you ask for Glenfield starch, see that you get it;" but when a colliery owner asks for a steel wire-rope of a certain quality is he certain that he can get it? I have not the slightest doubt that the rope is made of a certain number of steel wires, standard quality, and a number of wires of a very much cheaper quality, so as to get the price right. I, therefore, conclude that a manufacturer honest to himself, and strictly honest to the buyer, cannot supply a rope of this quality for less than 22*l.* to 23*l.* per ton. In homo or Bessemer steel ropes, if makers will only buy wire rolled and drawn from special ingots, 20*l.* to 21*l.* per ton is a fair price.—Crucible Steel Wire: It is at this stage "see that you get it" begins to be doubtful. Makers of rope wire charge 31*l.* to 32*l.* per ton for their wire; still the ropes are sold at the same price as is paid for the wire, showing a loss to the rope makers of 6*l.* 15*s.* per ton. Patent steel wire is worth 34*l.* per ton; the rope is sold at 35*l.*, showing a loss to the maker of 8*l.* 15*s.* per ton. Unless we are gammoned into taking improved patent, which is the same thing, then a respectable profit is obtained.—Plough Steel Wire: Prices for ropes range from 66*l.* to 94*l.* per ton, according to the gullibility of the buyer, the average price of the wire being 56*l.* per ton. I am not at all surprised at rope makers being so eloquent in favour of plough steel, as it seems to be the good fairy with the golden wand helping to make good losses incurred in the lower qualities. What are the inferences to be deduced from the above? That a very large amount of inferior metal is used in the manufacture; that imposition and deception is rampant, and that this is brought about by reckless competition. The wonder is that disaster is not a hundredfold more than at present. Property, no doubt, suffers severely, but this is generally hushed up—a golden salve curing numerous daily losses. I have it on the best authority that the instructions given to many representatives are to get the best price they can, but never to miss an order. Whatever another firm offers, undercut it; we can make up the difference with inferior material, and chance it. In my next I will consider the means best adapted to remedy this daily increasing evil.—*Manchester, Jan.* 22. A. P. M.

## CHECKS TO MINING SPECULATION.

SIR,—The year 1881 will be long remembered as a year of excitement in favour of mining speculation, of which advantage was taken by many to impose on the credulity of capitalists, who believed the prospectuses sent broadcast over the kingdom. The authors of those papers took care to secure a large portion of the subscribed capital for themselves, which was their main object: 40,000*l.* for a mine was a common charge. Very shortly after the capital was paid in the "wreckers"—the lawyers—commenced operations, their object being by upsetting the companies to secure the payment of large bills of costs. Some of the mines brought before the public would probably pay for working if fairly dealt with—Wheal Elizabeth and Great Wheal Polgooth to wit; but the promoters and lawyers prevented it by diverting the capital from its legitimate object. The heavy

premiums charged for the mines disgusted the public, who in general withdrew from the Cornish mines, and committed an equally eggregious folly by speculating in gold mines. Disappointment has checked mining speculation.

Mr. Basset's charge of 25,000*l.* for a renewal of the lease of Dolcoath Mine, four years before the expiration of the current one, was another check against the industry. Mayne's frauds, Boyn's frauds, the "cooking of accounts" in several mines, and crediting tin unsold and unbroken, are other checks on the speculating spirit, to which may be added the diminished price of tin. The tide never recedes so far that it does not flow again; and the rage for mining will as assuredly return as it has returned after former depressions, many of which I remember. If capitalists were dealt honourably with, instead of being deceived in the several ways just referred to, there would not be such crises as have occurred from time to time in this important industry.—*Truro, Jan.* 21. R. SYMONS.

## CALLINGTON DISTRICT.

SIR,—As an original shareholder in the Silver Hill Mine I was very glad to understand by "W. B.'s" letter, in your valuable paper last week, that there is a prospect of re-starting that valuable property. According to the testimony of some of the leading mining experts it has very rich copper, tin, and silver lodes, four or five of which have been cut rich in the tunnel, but not worked upon, as the directors unwisely carried out their original plan to drive the tunnel in order to intersect all the lodes before raising the ore and build reduction works. When the mine was stopped they were expecting to cut the "Good Luck" tin lode every hour.

The directors are very much to be censured for the manner in which the shareholders were treated, as they were not consulted, nor even advised of the stopping of the mine. I have not the least doubt had the shareholders been consulted then the necessary capital would have been raised to put the mine in the Dividend List. Should the mine be re-started again I hope that all the original shareholders will step in, in order to recoup themselves for their loss, the same as I intend to do myself.—*Islington, Jan.* 21. J. J.

## FAIR TRADE AND PROTECTION.

SIR,—In the first paragraph of my last week's letter there is a most awkward typographical error—"Free Trade" in place of "the trade," the latter being the title the liquor traffickers give to their trade, which destroys human bodies and souls; and here I will say something which will please the Mayor of St. Ives—that model Mayor of the model town of St. Ives, where the solitary policeman schools the children, having no public-house ruffians to contend with. Mr. Gladstone is a great and able statesman; words of wisdom drop from his lips. True political economy, he has said, is to make it easy to do right, and difficult to do wrong. Again, he has proclaimed that whatever is wrong can never be politically right; and, lastly, he has affirmed, and most truthfully, that the liquor traffic has committed, and is committing, more ravages than war, famine, and pestilence combined. Well, what is Mr. Gladstone working at now? Why, to lower the duty so as to let brandified Spanish wines into England, and so increase the ravages of drink, which are worse, says he, than war, pestilence, and famine combined. Surely this is making it easy to do morally wrong, and, therefore, cannot be politically right. In short, our Government are striving to make it easy to do wrong, and to augment the already fearful horrors of the drink traffic, which, says Mr. Gladstone, are worse than war, pestilence, and famine combined. Meanwhile, local option is refused session after session, so that moral wrong is perpetuated, though it cannot be politically right, and the thing which is worse than war, pestilence, and famine combined is perpetuated. I shall send a copy of this letter to Mr. Gladstone to digest as he hews down some offending tree.

But now for Fair Trade and Protection; or, in other words, Reciprocity. If there were a dozen men like Mr. Sampson Lloyd, who would devote themselves to opening the eyes of the working men of England, Free Trade, unless real Free Trade, would be swept away, and the London Press would have to cease singing their praises of John Bright's stupid blunder, which has done more evil to those working men than the Repeal of the Corn Laws ever did good. Mr. Lloyd's statistics and arguments carry conviction to the minds of all those who are not wilfully blind to facts and the logic of facts. "Common Sense No. 2" is quite right in attributing the early apparent blessings of Free Trade to the gold discoveries in California and Australia. The late Henry Burgess, many years editor of the Bankers' Circular, and one of the best real political economists of that day, held that these gold discoveries would avert for many years the national bankruptcy which, keeping open house for foreigners, must sooner or later entail, and which is at this moment sapping the foundations of England's honesty and prosperity, ably seconded by the gigantic monster of iniquity, the licensed sale of intoxicating liquors.

In your last week's letter from Cornwall there is, says the writer, no great harm in proposing Protection; but he appears not to consider such a measure a practical one. It is, however, most eminently practical. The only hope for the welfare of not only Cornwall but of the whole of Great Britain is bound up in it, and the opposition of a few capitalists abroad will not prevail against the wakening up of the people from the deadly lethargy of Free Trade, under which for many years they have been languishing.

The sanguine men who would work Carn Brea and Cook's Kitchen with black tin at 50*l.* per ton or less need not despair of obtaining fair protection. If not, let them clear off their present adverse balances, and in 12 months they will again be deeply in debt. The hope of winning Protection may be delusive; but it is the last hope for Cornwall, and as for making the best of things as they are, that is merely a cruel mockery. There is, indeed, something wrong when the miners of Cornwall are diminished in 12 years by 5000, and that something wrong is the flagrant permitted robbery of Cornish men and masters for the sake of the Dutch, Spaniards, and South Americans, and the English capitalists abroad, who are fattening on the ruin of their own countrymen. Free Trade and drink have created horrible London and the horrible dens of large towns. Where ten men used to work on the land three are now employed; the others rot in the drink and Free Trade created slums, and the London Press prate about our wealth and prosperity; whilst John Bull, who cannot think, accepts these impudent boastings as sacred truth. Works now can only be carried on by cutting down wages, and this is a process which sooner or later will end in revolution.

*Jan.* 21. RECIPROCITY.

## FAIR TRADE AND RECIPROCITY.

SIR,—The leaders of the Free Trade movement, Messrs. Bright and Cobden, believed that after the first great International Exhibition all the world would be at peace, and that it was utterly wrong to keep up the strength of the army and navy, although the estimates had been so reduced by certain visionary economists that there was scarcely at that time a battery of guns fit for action, or a vessel for the transport of troops fit for sea. The army and navy have since been called upon to do battle in almost every clime; and England now stands supported by a noble defending force of 200,000 brave and effective volunteers. The prognostications of Messrs. Bright and Cobden were equally fallacious with regard to Free Trade. According to their Utopian views all nations would at once join England, and throw open their ports, and the whole world would be free.

Since those days—owing not to Free Trade but to railway communication, steam navigation, electric telegraph, improvements in ships and machinery, vast discoveries of the precious metals, and a variety of other causes—the commerce of the world has enormously increased; but, strange to say, England, with all its so-called Free Trade and all its natural advantages, lags sadly behind. In considering the policy of England, which, after a period of upwards of 40 years, stands alone in the mode of conducting its commercial transactions, the following facts may, perhaps, be considered worthy of careful thought. If Englishmen are paying a large portion of the duties imposed by foreign nations, it must be evident that they are not only contributing to the support of their own Government, but are also helping other governments without getting anything in return.

English proprietors of coal and iron mines, and the workmen as well, must be losing whatever proportion of the foreign tax is paid by the exporter—*i.e.*, the iron and coal miner. Either the foreigner pays all his own tariff, or England is paying the taxes of other nations as well as its own. This is a position which can scarcely be questioned with regard to mining, and it is a fact that the gross value of ironworks assessed to income tax, which in 1874 was 7,218,000*l.*, in 1849 had fallen below 2,000,000*l.*

It may be well at the present moment to look also at the effect produced by one-sided Free Trade on agriculture, the main source of real national wealth. Agricultural land has fallen in value 40 per cent., which represents something like 30,000,000*l.* per annum. House property has fallen 20 per cent., or 20,000,000*l.* per annum, and the rapid fall of real property during the past few years has reached the alarming total of 1,000,000,000*l.* sterling of capital value, and according to modern communatic tactics, the owners are, it would seem, to be subjected to still further misfortunes. The question is now becoming one of general serious consideration whether English agriculture and English mining—two great national interests—are to be swamped by foreign stringently protracted tariffs, and by overwhelming foreign competition. ARGUS.

*Tavistock, Jan.* 23.

## COST-BOOK COMPANIES—A REFORM WANTED.

SIR,—It is high time that the mining industry, and those having some influence therewith, put their mind and brains to set the concern in order; that is, if they have the well-being of the industry at heart. Certainly the revelations of last year were disgraceful; but, Sir, what is to be said already of this year? The system and management in which many Cost-book companies seem to have carried on their finance are, to say the least, abominable. Plenty of mud has been thrown at the Limited companies, but the day of reckoning amongst the Cost-book concerns, as being revealed, say mighty little for their credit and much-lauded management; and, as we see, compelled many strong holders to give up altogether, and relinquish all further holding therein. This is very much to be regretted, as it cannot be doubted its effect will in time be duly felt. False prospectuses, extravagant boards, with sham mining, have done their share by Limited companies to ruin this industry. But, methinks, the painful revelations of these latter days amongst Cost-book concerns will but add fuel to the already swelling murmur of anger by many of its closest friends and adventurers. Are such concerns not to be saddled with a heavy share of blame in adding to the ruin which may follow? Undoubtedly.

Heavy calls by wretched management is the ghost most dreaded by investors. And there is no use blinking the fact that such loose management or finance is only playing into the Limited companies' hands, and in turn would be made the most of by promoters of such; not only so, but seeing both systems do not offer that security to investors that it ought, by reason of extravagance, what is the most natural result but that investors will fight shy of mining as of American stocks, which are a very good example of the many ups and downs it gets, with the burnt fingers into the bargain. Now, Sir, there are a class of persons who if they would really take the question of honest mining could effect radical reforms from their powerful influence. I mean stockbrokers, who in a great measure earn to a more or less extent income from mining transactions; they in great part influence investors or speculators in their dealings with, them. If they as a class set themselves against spurious undertakings probably floated or about to be so, they would earn respect to themselves as a body; but unfortunately self is first and foremost; the general weal is counted nothing, and thus many investors are wrecked, and in turn disaster follows in the industry and locality. It is not to be doubted that for selfish reasons or motives they often lead investors astray on the wrong horse; but they cannot do it with impunity. Therefore, it lies with them to bestir themselves, and try to reform and bring about a change in mining management, by speaking out against it where wrong. Reform is urgently required in many ways by this industry; an investing public will mark the wrecks, and those who assist in making them so. Then mining will be shunned, if not reformed, as an evil thing by a determined public, and leave it to Cornishmen who have more faith than riches to lose.—*Leith, Jan.* 22. ANOTHER SCOT.

## LEGITIMATE MINING INVESTMENTS.

SIR,—It must be universally admitted by all those connected with mines during the past year that it has been one of the most disastrous in the annals of mining, not only for the heavy amount of expenditure and continued calls made on the shareholders, but the general depreciation of the value of stock as compared with prices 12 months since, when several of the mines in Cornwall and Devon held out great promises of success; but those anticipations have not been realised, and shares are considerably lower and at a serious discount in most instances. Previous to this the greatest injury to legitimate mining has been the promotion of several worthless gold schemes, many of which are now defunct, and the resuscitation of several old worked out deep mines started only for promoters' purposes, without any prospect of sufficient returns being made to meet the cost of drainage, or even any hope of seeing the bottom of the mine, and yet the investing public have been tempted to throw their money into such fictitious concerns, no doubt easily allured by the inducements held out in a glittering prospectus, splendid reports, glowing future, knighted directors, and the display of oratorial power, combined with shares being to an immediate high premium; when if the necessary precaution had been used by making enquiries of those who are conversant with the districts as to their respective merits and true position of these old mines, a large amount of capital now sacrificed would have been saved.

Most of these Limited Liability promotion mines are now dragging out a miserable existence, and will shortly witness their closing scene from want of further capital, which is but a sad recompense to the unfortunate shareholders. Not one-half of the capital subscribed has been expended in strict development of the mines, and the necessary erections, although the latter in some instances stand prominent and will ere long remain a dull monument of fabricated fame. Such projects as these have been more detrimental to mining than any other source, and deter the would-be investor from again embarking in any further mining speculation, however legitimate or profitable. No doubt if the amount of capital which has been utterly lost in these old worn-out mines had been expended judiciously in opening out new ground in a recognised mineral district the result would have been more satisfactory. I am of opinion that if capital carefully invested in home mines (especially at present low prices), with good management, in a well-selected list of mines, and an improved price for their metallic produce is quite equal to any other commercial enterprise, and paramount success attending it.—*Liskeard, Jan.* 24. M. W. BAWDEN.

## POLCREBO TIN MINE.

SIR,—It is almost a duty, in these times of depression, to report valuable discoveries through the Journal, which is looked upon as the chief source of encouraging the enterprise of mining—the staple industry of the West of England—and I trust, Sir, it will give you, and many thousands of your readers, pleasure, although not directly interested, to find that success has again resulted from perseverance and well-directed energy at Polcrebo, and there is reason to feel that all will be obtainable by the present company which the previous four companies failed to realise.

This mine was drained to the 30 below adit, which was the bottom of the engine-shaft, about 12 months since. During the last year several notices appeared in the Journal favourable to the progress, while great anxiety was manifested on the part of the manager to sink the Highburrow shaft, which was only 17 fathoms below adit, to the same depth as the engine-shaft, and to extend a level east at that depth, beneath the old workings. The fact that no less than ten shafts had been sunk from surface to adit within a distance of 110 fathoms, and all the lode taken away, and that also the lode had been followed to a depth of 17 fathoms below adit without any proper appliances for draining and ventilation, and for more than 50 fathoms in length at that depth the lode had been removed, was convincing to the manager that a rich lode must have existed, and he hastened the sinking of Highburrow shaft, and in the 30 drove a level east 28 fathoms, where the expected riches have been met with. The lode being of great width has not yet been cut through, there being a considerable flow of water from it, but altogether, as far as seen, the prospects are most cheering.

There are 70 fathoms more to drive to reach Harvey's shaft. In the 25, east of the present end, the Great Wheal Worthy lode forms a junction with this lode, and they are expected to continue united as one large lode to the end of the sett; this level is being driven at 4*l.* per fathom, by six men. The Highburrow shaft is nearly completed to the 40, with a much richer lode than in the 30. In the 40 levels will be driven east and west upon the lode, opening up a succession of backs for stoping hundreds of fathoms in length, with about an average height of 25 fathoms. Steam-stamps are now required, and must be quickly got to work, when this mine will rank amongst the best in the county.—*City, Jan.* 24. M. N.

## WOOD CLIFF TIN AND COPPER MINE.

SIR,—Ashburton was an old Stannary Court town, where there was a monthly market held of black tin, and now this may be revived, for in costeaning a piece of virgin land of Lord Clinton's a fine tin lode has been discovered by me that will produce 56 lbs. of black tin to a ton of lode stuff, consisting of quartz, peach, and mundic. The lode is 8 ft. big, and only 6 ft. from the surface in a beautiful channel, and half a mile from the town and station; every available advantage for working the mine, an everlasting stream of water called the Old Yor, roads ready made, and through the sett of 100 acres an adit driven to cut a copper lode, but not driven far enough to reach the lode; a few fathoms south of tin the finest elvan is seen, equal to any ever met with in Devon or Cornwall. The land from where the tin and elvan is found rises 40 fathoms, so that adits can be driven besides that partly driven on the copper lode. The assays of tin have been tried by thorough tin dressers, Captain J. Browning, who had great experience at Headland and Vitiford, Thos. Treathen, and Geo. Budge, who have dressed, assayed, and sold tons of black tin. Plenty of timber near and on the spot.

*Ashburton, Jan.* 23. GEORGE SPARKE.

## MINING IN ST. STEPHEN'S.

SIR,—This parish has not hitherto been held in high estimation—like Gwennap, Camborne, and Illogan—as a mining centre, because it has not been developed like them. But I see no geological reason why, if fairly developed, it should not become as productive of both copper and tin as those celebrated parishes. There is not a mine in the parish of any considerable depth; and so far as the investigation has proceeded, evidence has been furnished that it is a tin-bearing parish, warranting deeper development. In South Terras Iron Mine a rich copper lode has been met at the 40—the first discovery of that mineral in that parish, which is likely to give a stimulus to mining in the district, and to secure a better reputation for it than that in which it has been held.

A great deal has been said in past times against New Terras. The returns of tin ore will ere long satisfy the company and the public as to its stanniferous productiveness. I will not, therefore, say anything in its praise. The machinery set in motion, experimentally, 10 days ago was admired by all observers, and the tinstone waiting reduction will soon be submitted to the stamping-mill—if not already done—and the produce sent to market. I do not go so far as one reporter did by alleging that 1,500,000*l.* worth of tin are in the sett, nor can I prove him to be in error. R. SYMONS.

*Truro, Jan.* 22.

## STRUGGLING MINES, &c., AND DIVIDENDLESS SHAREHOLDERS.

SIR,—There is one very important point to which shareholders must soon give direct attention, and the sooner they do so the better. It is the case of those mines struggling on for years, just paying workmen, officials, and directors, but which will probably never pay a cent to shareholders, who are kept patient year after year by sanguine hopes of better things, administered to them in hopeful glowing speeches of chairmen, who in these ticklish cases must be specially picked for the task. Many readers of this will single out some mine or other venture where the above has been the history of years. It is time those histories should cease, if the business will not do more than keep the parties above mentioned. As far as we shareholders are concerned the sooner they are wound-up the better. A glance through a book called "The Directory of Directors" will show what a good thing it is to be on several, not to say numerous direc tories. Those directors' investments must pay well; the qualifications must bring in many hundreds per cent. . . . JOHN GRIFFITHS.

## MOUNTS BAY CONSOLS.

SIR,—As the annual meeting has to be held next week I trus some shareholder will ask Mr. Henry Browne, the purser, what hi opinion of this mine is now. At the meeting held in December, 1882, he is reported to have said—"I believe myself that Mounts Bay is one of the grandest mines in the county of Cornwall. Everyone of the 27 lodes will pay back nearly one-third of the capital—that is, above the adit level. If the other lodes do the same we shall have to build houses to hold the money." As I cannot attend the meeting, I hope to see some cheering reports in the *Mining Journal* of Feb. 2.—*Jan.* 22. D. AYR.

## EAST WHEAL ROSE.

SIR,—In last week's *Mining Journal* your correspondent makes a mistake in supposing that East Wheal Rose ceased working from lack of produce. The cause of its failure was flooding by a waterspout, when it was in full and most successful operation. The difficulties the present shareholders have to meet were to drain the mine and again come down upon profitable material, which is now, it appears, on the eve of being accomplished.

Having made myself locally acquainted with particulars from those who are disinterested in the mine or adverse to it, I look forward with hope to the report of the approaching meeting of the shareholders for further information, but am at present convinced that if the affair were to be at once wound up it would be good policy for the shareholders to invest the remnant of their outlay on a new company, with sufficient capital to proceed with operations on the mine, as it appears to me that nothing but capital and patience are required to cover all apparent losses and make it a most remunerative property.—*Barnstaple, Jan.* 22. K. D.

GREAT WHEAL POLGOOTH MINING COMPANY.—The action brought against the directors and managing director of this well-known company which has been before the law courts for the last three years has been decided in favour of the defendants, the Court having found that the collapse of the company was in no way owing to any fault or want of due care on the part of the directors or managing director.

EVOLUTION OF THE WORLD.—At the meeting of the Victoria Philosophical Institute on Monday, Sir E. Beckett, Bart., Q.C., in a paper on this subject, described the laws of Nature, reviewing the steps in the progress of scientific research recently made in various countries, and showing how they bore on the question—Is all creation in its perfect arrangement, its beauty and grandeur, self-evolved, as some assert; or are we not compelled, after patient investigation of its many departments, to confess that there is something beyond, which we are forced to recognise, evidences the existence of one Great, all-controlling, wise Mind? An interesting discussion ensued.

HOLLOWAY'S PILLS.—When inclement weather checks to a considerable extent the action of the skin, an alterative is required to compensate the body by means of other channels. Holloway's pills can be confidently recommended as the easiest, surest, and safest means of attaining this desirable end without weakening the most delicate or incommoding the most feeble. When from frequently recurring chills or the inhalation of impure air the blood becomes foul and the secretions vitiated, these pills present a ready and efficient means of cleansing the former and correcting the latter. By this salutary proceeding disease is arrested at its outset, its pains and inconveniences averted, and the nervous structures saved from the depressing effects entailed upon them by an illness.

## PROVINCIAL STOCK AND SHARE MARKETS.

CORNISH MINE SHARE MARKET.—Mr. S. J. DAVEY, mine share-dealer, Redruth (Jan. 24), writes:—Our market has been very dull this week with rather more disposition to sell, and but little inclination to buy. Prices, on the whole, show a decline. At Tincroft meeting to-day a call of 15s. per share was made. Subjoined are the closing quotations:—Blue Hills, ¼ to ⅜; Carn Brea, 1⅜ to 1⅝; Cook's Kitchen, 8 to 10; Dolcoath, 60½ to 61½; East Pool, 34½ to 35¼; Killifreth, ⅞ to 1⅛; New Cook's Kitchen, 2¼ to 3; New Kitty, 1¾ to 2; South Condurrow, 9½ to 10; South Crofty, 2 to 2⅛; South Frances, 6 to 5½; Tincroft, 1½ to 2; West Basset, 1¾ to 2; West Frances, 7¼ to 8; West Kitty, 12¼ to 13; West Peevor, ¼ to ½; West Poldice, ¼ to ⅜; Wheal Agar 11 to 12; Wheal Basset, 3¾ to 3¾; Wheal Grenville, 5⅛ to 5½; Wheal Peevor to 2⅛; Wheal Kitty, ½ to ¾; Wheal Uny, ⅞ to 1; West Polbreen, ⅝ to ⅞.

— Messrs. ABBOTT and WICKETT, stock and share brokers, Redruth (Jan. 24), write:—A dull market throughout the week with but few transactions. Closing quotations herewith:—Blue Hills, ⅛ to ¼; Carn Brea, 1⅜ to 1½; Cook's Kitchen, 8 to 9; Dolcoath, 60½ to 61; East Pool, 34¾ to 35¼; Killifreth, ⅞ to 1⅛; Penhalls, ⅛ to ¼; New Kitty, 1¾ to 2; South Kitty, ¾ to ⅝; South Condurrow, 9½ to 10; South Crofty, 2 to 3; South Wheal Frances, 5¼ to 5½; West Basset, 1¾ to 2; West Kitty, 12½ to 13; West Frances, 7¾ to 8; West Seton, 7 to 8; Wheal Agar, 11 to 12; Wheal Basset, 3¼ to 3½; Wheal Grenville, 5½ to 6; Wheal Kitty (St. Agnes), ⅛ to ¾; Wheal Peevor, 2 to 2½; Wheal Uny, ¾ to 1.

— Mr. M. W. BAWDEN, Liskeard (Jan. 24), writes:—The mining market continues dull with a general depression, and quotations are still lower. The present ought to be most opportune for investment. At St. Just United Mine meeting held on Tuesday the accounts showed a profit of 1200*l.* on the four months' working. A good dividend is expected at the next meeting. Subjoined are the closing quotations:—Bedford United, 1½ to 1⅝; Carn Brea, 1¾ to 1½; Cook's Kitchen, 8 to 8¼; Dolcoath, 60 to 60½; Devon Consols, 2¾ to 3; Devon Great United, ½ to ¾; East Caradon, ¼ to ⅜, c. p.; East Pool, 34½ to 35; Glasgow Caradon, ¾ to ⅞; Gawton United, 1s. to 1s. 6d. 6d.; Gunnislake (Clitters), 1⅜ to 1½; Herodsfoot, 1s. to 1s. 6d.; Hingston Down, ¼ to ⅜; Killifreth, 1⅛ to 1¼; Marke Valley, ¾ to ⅞, c. p.; New West Caradon, 1s. to 1s. 6d.; Old Gunnislake, ½ to ¾; Phœnix United, 1 to 1½; Prince of Wales, ⅜ to ½; South Caradon (Limited) fully paid, ⅞ to 1; South Condurrow, 9 to 9¼; South Crofty, 4 to 4¼; South Devon United, ¾ to ⅞; South Frances, 5¼ to 5½; Tincroft, 1½ to 1¾; West Basset, 1¾ to 2; West Caradon, ⅛ to ¼; West Frances, 7¼ to 7½; West Kitty, 12¼ to 12½; West Crebor, ⅛ to ¼; West Phœnix, ½ to ⅝; Wheal Crebor, 1¾ to 2; Wheal Grenville, 5¼ to 5½; Wheal Kitty, ⅛ to ⅜; Wheal Jane, 2s. to 3s.; Wheal Peevor, 1 to 1¼, c. p.; Wheal Uny, 1¼ to 1⅜; Wheal Basset, 4¼ to 4½; Wheal Agar, 11¼ to 11½; St. Just United, 4½ to 5; West Seton, 6 to 6¼.

— Mr. JOHN CARTER, mine share dealer, Camborne (Jan. 24), writes:—In the share market Dolcoaths have declined to 61 sellers. Wheal Agars improved to 11⅛ buyers but close sellers. At Tincroft meeting to-day a call of 15s. per share was made. Subjoined are the closing quotations:—Carn Brea, 1¾ to 1½; Cook's Kitchen, 8 to 9; Dolcoath, 60 to 61; East Pool, 34½ to 35¼; Killifreth, 18s. to 20s.; Mellanear, 2 to 2½; New Cook's Kitchen, 2½ to 3; New Kitty, 1¾ to 1⅞; Penhalls, ⅛ to ¾; South Condurrow, 9½ to 10; South Crofty, 2 to 2⅛; South Frances, 5¼ to 5¾; Tincroft, 30s. to 40s.; West Basset, 2 to 2¼; West Frances, 7¼ to 8¼; West Kitty, 12¼ to 13; West Peevor, ¼ to ¾; West Seton, 5 to 6; Wheal Agar, 11 to 11½; Wheal Basset, 3½ to 4; Wheal Grenville, 5½ to 6; Wheal Kitty, ⅜ to ⅝; Wheal Uny, 1 to 1¼; Wheal Peevor, ¾ to 1¼.

MANCHESTER.—Messrs. JOSEPH R. and W. P. BAINES, share brokers, Queen's Chambers, Market-street (Jan. 24), write:—There is no phenomenal feature to record as presenting itself since we last wrote. A moderate business has been concluded, and prices show no general inclination, the changes that have taken place being the result of individual influences which have affected the several stocks irregularly. What approach to tone of market there is is towards ease, which may be attributed possibly to the slight upward movement in the value of money and reports of railway meetings recently held. Foreign stocks have a good record, as with the exception of Peruvians, which are ⅞, and Turkish Stamped ¼ lower, all the alterations marked are favourable. Egyptian Unified are 1⅛; ditto Pref., ⅜; and Daira, 1. Italian, 1½; Spanish, ¾; and Russian, ⅝ higher. Mexican railways fluctuate a little, and on balance are about 1 better than last week; but another decrease (630*l.*) the future prospects will hardly, we think, be viewed with equanimity except by bears. Suez Canals have moved backwards and forwards a little, finishing with a rise of ⅞ to ⅛ on the week. Miscellaneous investments have changed hands to an extent about the average for some time back, but, with the exception of banks, lower prices predominate.

BANKS.—As has been the case for some time, and as usually is the case, this class shows market firm and tone good, with a fair proportion of the total of miscellaneous business passing therein. The only instance of decline occurs in Lancashire and Yorkshire, which are ⅛ lower notwithstanding declaration of a dividend at rate of 10 per cent. for past half-year, making 9 per cent. for the year. Sellers of Manchester and Liverpool Districts ask ½ more, and Parrs are ¼. Manchester and County, ⅛ to ¼; and Manchester Joint Stock, ¼ higher.

INSURANCE shares, though a fair number of transactions are recorded, have a decided majority of adverse changes in quotations. Queens are 1/32 to 1/16, and Sea 1/16 higher, but the following are lower:—Maritime, 11/16; Thames and Mersey and Marine, ¼; Lancashire and Yorkshire Accident, 1/16 to 3/16; Manchester Fire, ¼; British Re-Insurance, ⅛; Lancashire, ⅛; and Royal, 1/16.

COAL, IRON, &c., AND MINING.—A few lots have changed hands, but they are chiefly solitary transactions, no concern showing any activity. Bolckows unchanged, Ebbw Vales better. Tredegar contradictory, the A being lower whilst the B issue mark a rise. Great Laxey Lead and A. Knowles have slipped away again.—Higher: Ebbw Vale Steel, &c., ⅜; Tredegar, B, ¼ to ¾.—Lower: Great Laxey, 1½; Cammells, ¾; Knowles and Sons, ½; Rio Tinto, ½; Staveley, A, ⅛; and Tredegar, A, ⅜ to ⅝.

COTTON SPINNING, &c.—Little if anything fresh to report, fair business in progress, and tone of market rather quiet, contributed to by the proposals for new concerns.

TELEGRAPHS.—Atlantic cables decidedly lower. Anglos of all issues and Directs all participating in a fall. Western Brazilian ⅝ higher.—TELEPHONES irregular. Lancashire and Cheshire 6d. lower, Uniteds ⅓ better.

CORPORATION STOCKS unaltered.—MISCELLANEOUS.—Gas Light and Coke A Ordinary 1 to 2 higher, Anglo, A, Brush Electrics 1 lower. Rylands and Sons further improved ½. Westheads, with a dividend of 1s. per share recomended, are not quotably altered. Southport Winter Gardens are quoted lower.

RAILWAYS.—Prices again show irregularity, and though the money market is dearer and Bank reserve not so favourable as of late, the changes have arisen mainly from half-yearly meetings and reports of the various stocks acted upon, and their kindred concerns. For instance, the Gt. Eastern announce an increase of capital of 2,000,000*l.*, and apparently under fear for their later pref. dividends the stock has fallen 3 per cent. The Chatham Preference dividend is a distinct and satisfactory gain, showing a surplus of 9000*l.* after payment in full, and this caused a small gain in their value. The Sheffield meeting denotes aggression and increased capital. Stock lower, and traffics discouraging. North-Easterns dividend 3¾, same as last year, but they fell away from the highest point, but on balance are ⅜ higher on the week. North-British have relapsed ¾. Southern lines firmer. In the heavy lines, Great Westerns, Londons, and Great Northern, A, are a little higher, but Midlands and Lancashire and Yorkshire are rather lower. Canadians, under influences of curtailed accounts and a hope that the traffics will show better than recently, are decidedly higher than the lowest points. This week's traffic total decrease 11,784*l.* Americans are again lower on disquieting rumours.

NEWCASTLE-ON-TYNE.—Mr. S. N. CHALLONER, stock and share broker, Grey-street (Jan. 24), write:—Barrow steel shares are without change, at 7½ for Ordinary and 9¼ for Six per Cent. Pref.; and Bolckow shares remain 18⅜ to 19, and 10¼ to 10½ for 12*l.* paid shares, but some improvement in the price may be looked for during the next few days, the company having decided to commence work and give employment to any of the men who are willing to accept the 10 per cent. reduction. Consett iron are a shade firmer, at 20¼ to 20½. Ebbw Vales have improved ⅜, at 5⅜ to 5⅝; while C. Cammell's are ⅛ lower, at 67½ to 68. John Brown's without change, at 57⅛ to 58¼. Palmer's, A, at 26 to 26½; B, at 16⅞ to 17½. Pelsall coal at 11 to 12; Tees-side Iron Ordinary, 10s. to 20s.; Preference, 1½ to 1¾. West Cumberland Iron at 7⅜ to 7½; while Sir W. G. Armstrong Mitchell's are 1½ lower, making a fall of 3¾ per share since the company advertised for 220,000*l.* mortgage debentures. They offer 4 per cent. for three years' bonds, 4¼ for 5 years, and 4½ for seven years; latest price is 125 buyers. North-Eastern Bank shares are a shade firmer, at 6⅜ to 6½; the directors recommend a dividend at the rate of 3s. 6d. per share for the second half of 1883, being at the rate of 5*l.* 16s. 8d. per annum, against 5*l.* 8s. 4d. per annum for the corresponding half of the previous year, making dividend for the whole year 1883, 5*l.* 12s. 6d. per annum, against 5*l.* 4s. 2d. for 1882, and 4*l.* 7s. 6d. for 1881. Hartlepool Gas and Water remain firm, A, at 9¼ to 9⅜; B, at 8¼ to 8½; C, 7¾ to 7⅞. Newcastle Water is 1 higher, at 177 to 178; Newcastle Gas 1, at 173 to 174. High Goaforth Parks are 2 lower, at 12 to 15. Lawes without change, at 5½ to 5⅞. Sadler and Co., ¼ higher, at 2⅜ to 2¾ prem.

## SCOTCH MINING AND INDUSTRIAL COMPANIES SHARE MARKETS.

STIRLING.—Mr. J. GRANT MACLEAN, stockbroker and ironbroker (Jan. 24), writes:—During the past week the markets have continued dull, owing to the unfavourable condition of trade. Rarely have the markets continued depressed so long without some recovery of consequence, but there is still no appearance at present of anything to cause an important movement, either one way or the other.

In shares of coal, iron, and steel companies the principal alteration is a decline in Shotts Iron to 35. Reading Iron shares offered. Bolckow Vaughan and Ebbw Vale are both firmer. Bulls Iron, 20s. to 25s.; Cardiff and Swansea, 55s. to 60s.; Marbella declined from 70s. to 63s., and are now 65s.; Nant-y-Glo and Blaina, 49 to 50; Steels remain about 8¾, but it is expected that the strike of their workers will be arranged; West Cumberland, 7¼ to 7½.

In shares of foreign copper concerns prices are steady. Tharsis touched 6⅝ for share warrants, but are now easier. Arisonas have declined from 25s. to 24s. 6d. Brateberga, 35s. to 40s.; Corporation of South Australia, 7s. 6d. to 10s.; Copiapo, 60s. to 65s.

In shares of home mines business is still quiet. Anderton are at 17s. 6d.; Bedford United, 33s.; Camborne Vean, 2s. 3d.; Carnarvonshire Great Consols, 2s. 6d. to 7s. 6d.; Devon Great Consols, 69s. to 70s.; Devon United, 6s. to 8s.; Devon Friendship, 2s. to 4s.; Drakewalls, 5s. 6d.; East Craven Moor, 1s. 3d.; East Wheal Rose, 4s. to 5s.; East Van, 5s. 6d.; Gunnislake (Clitters), 26s. 3d.; Great Laxey, 10½; Leadhills, 55s. to 57s. 6d.; Mounts Bay, 2s. 9d.; North Blue Hills, 1s. 3d.; Old Shepherds, 5s. to 7s.; Owen Vean, 15s.; Sortridge, 2s.; St. Just United, 50s.; Tamar, 9s. 9d.; Tankerville, 1s. 9d.; Tregontrees, 1s. 6d.; Treavean, 4s. to 6s.; Wheal Castle, 5s. to 10s.; Wheal Grenville, 5 to 5½; Wheal Jane, 10s. to 12s. 6d.; Wheal Kitty, 12s. to 14s.; and Yorkshire Lead, 8s. 9d.

In shares of gold and silver mines the principal alteration is an improvement in United Mexicans from 8¾ to about 9⅛, on their weekly profit showing an improvement. Richmonds declined to 4¼, but are now firmer. Great Zarumas and Trojis are offered. Chile Debentures wanted. Akankoos are at 7s. 6d. to 8s. 9d.; Antioquia, 3s. to 5s.; Brazilian, 2s. 9d.; Colombian Hydraulic, 5s. to 6s.; Denver, 2s. 6d. to 3s. 9d.; Frontino, 23s. 9d. to 26s. 3d.; Gold Coast, 5s. to 6s. 3d.; Guinea Coast, 4s. 3d.; Indian Wentworth, 2s. 6d. to 5s.; Indian Glenrock, 1s. to 2s.; Kapanga, 1s. 3d. to 2s. 6d.; Kohinoor, 6s. to 8s.; La Plata, 5s. to 7s.; Lisbon-Berlyn, 2s. 6d. dis. to par; Montana, 40s. to 42s. 6d.; New Gold Run, 1s.; Rio Grande A, 3s. 3d.; Rosea Grande, 1s. 6d.; Tacquah, 3s. 6d.; Victoria, 15s. 6d.; West Callao, 9s. to 11s.; and Yuba River, 2s. to 5s.

In shares of miscellaneous companies there has been little business doing. Oil companies shares steady. Home Mines Trust, 9s. to 11s.; Lawes' Chemicals, 5⅜ to 5⅞; Nobel's Explosives have declined from 23¾ to 22⅝.

EDINBURGH.—Messrs. THOS. MILLER and SONS, stock and share brokers, Princes-street (Jan. 23), write:—The railway market has been moderately steady since last report. Caledonian, Glasgow and South Western and Great North are rather higher. North British is somewhat lower and Edinburgh and Glasgow has relapsed. Preference stocks have in several instances brought enhanced prices. Canadians have been flat and Americans have been depressed. Banks shows no change of much importance. Prairie Cattle shares, Western Land and Western Ranches are lower, but Swan Land are higher. In mines, Arizonas, Clyde Coal, Cairntable, Glasgow Caradon, and Shotts Iron are lower, while Tharsis are higher.

## IRISH MINING AND MISCELLANEOUS COMPANIES SHARE MARKET.

CORK.—Messrs. J. H. CARROL and SONS, stock and share brokers, South Mall (Jan. 23), write:—Markets were quiet to-day. Great Southerns were done at 120¼. Midlands were dealt in at 83, and Wicklows at 63. National Bank shares changed hands at 25 1-16th, and Munsters at 6 7-16th. Cork Gas are 7 7-16th; Cork Packets, 11¾; Gouldings, 8 15-16th buyers. Lyons 5*l.* paid shares bought at 6*l.* 11s. 3d., and Levys enquired for at last price.

## MINING COMPANIES REGISTERED IN 18

BY EDWARD ASHMEAD, F.C.A.

(THE EIGHTH ANNUAL TABLE OF A SIMILAR NATURE).

### BRITISH.—METALLIFEROUS MINES.

| Title. | Situation. | No. of Shares. | Per Share. | Nominal Capital. |
|---|---|---|---|---|
| Brandley Mining | Cumberland | 25,000 | 1 | £25,000 |
| Brough-with Hilbeck | Westmoreland | 2,000 | 1 | 2,000 |
| Builthy Mine Lead and Barytes | Salop | 15,000 | 1 | 15,000 |
| Coryton United Manganese | Dev. & Cornwall | 60,000 | 1 | 60,000 |
| Creiglog Mining | Denbigh | 30,000 | 1 | 30,000 |
| Devon Con. Manganese | Devon | 40,000 | 1 | 40,000 |
| Duchy Peru | Cornwall | 50,000 | 1 | 50,000 |
| East Killifreth Tin Mine Synd. | ditto | 120 | 50 | 6,000 |
| East Treburgett Mines | ditto | 30,000 | 1 | 30,000 |
| Ecton Company | Stafford | 50,000 | 1 | 50,000 |
| Elliscales Mining | Lancaster | 120 | 50 | 6,000 |
| Erglodd United Mines | Cardigan | 10,000 | 5 | 50,000 |
| Falcon Mining | Cumberland | 150 | 100 | 15,000 |
| Gawton Company | Devon | 14,000 | 2½ | 35,000 |
| Great Wheal Grylls | Cornwall | 50,000 | 1 | 50,000 |
| Halkyn Mining | Flint | 10,000 | 1 | 10,000 |
| Hardshins Mining | Westmoreland | 8,400 | 0½ | 4,200 |
| Harlech Sulphur Mining | Merioneth | 50,000 | 1 | 50,000 |
| Holbeck Mining | — | 12,000 | 5 | 60,000 |
| Holway Consols | Flint | 35,000 | 1 | 35,000 |
| Minera Consols | Denbigh | 30,000 | 1 | 30,000 |
| Melyn Lynn Pair Silver-Lead | Merioneth | 32,000 | 1 | 32,000 |
| Metal Band Mining and Copper | Cornwall | 15,000 | 1 | 15,000 |
| New East Wheal Rose | ditto | 50,000 | 1 | 50,000 |
| New Great Work | ditto | 30,000 | 1 | 30,000 |
| New Hafod Lead | Flint | 10,000 | 1 | 10,000 |
| New West of England Mang. | Devon | 20,000 | 1 | 20,000 |
| North and South Llangynog Silver-Lead | Montgomery | 25,000 | 2 | 50,000 |
| Plushey's Mining | Cornwall | 6,400 | 2 | 12,800 |
| Russell Copper Mine | Devon | 40,000 | 1 | 40,000 |
| St. Blazey Great United Tin and Copper | Cornwall | 50,000 | 1 | 50,000 |
| South Caradon | ditto | 50,000 | 1 | 50,000 |
| South Phœnix and Caradon | ditto | 30,000 | 1 | 30,000 |
| South Roman Gravels | Shropshire | 30,000 | 1 | 30,000 |
| Tregontrees and Old Polgooth Consols | Cornwall | 50,000 | 1 | 50,000 |
| United Cambrian Copper | Cardigan | 25,000 | 1 | 25,000 |
| W. B. Lead Company | Northumberland | 750 | 100 | 75,000 |
| Weardale Lead | Durham | 50,000 | 4 | 200,000 |
| Westminster Consols | Flint | 30,000 | 1 | 30,000 |
| Wheal Benny | Cornwall | 4,000 | 5 | 20,000 |
| Wheal Camborne | ditto | 60,000 | 1 | 60,000 |
| Wye Mine | Montgomery | 21,866 | 1 | 21,866 |
| | Total | | | £1,554,866 |

### COAL AND IRON.

| | | | | |
|---|---|---|---|---|
| Bettws Llantwit Coal | Glamorgan | 2,000 | 5 | £10,000 |
| Brearley Colliery | Lancashire | 400 | 5 | 2,000 |
| Brynkinalt Collieries | Denbigh | 500 | 50 | 25,000 |
| Cortonwood Collieries | — | 17,500 | 10 | 175,000 |
| Deeside Colliery | Flint | 30,000 | 1 | 30,000 |
| Dinas Clydach Colliery | Monmouth | 400 | 50 | 20,000 |
| Duxbury Park Colliery | Lancashire | 800 | 50 | 40,000 |
| Flint Coal and Cannel | Flint | 2,000 | 5 | 10,000 |
| Hanley and Bucknall Coal | Stafford | 1,500 | 5 | 7,500 |
| Lanclay Colliery | Glamorgan | 200 | 100 | 20,000 |
| Lidgett Colliery | York | 300 | 50 | 15,000 |
| Longwitton Ganister Coal | Northumberland | 1,500 | 10 | 15,000 |
| Lydbrook Colliery | Gloucester | 1,500 | 10 | 15,000 |
| Maryport Hematite Iron | Cumberland | 1,000 | 50 | 50,000 |
| Mitchell Main Colliery | Yorkshire | 320 | 100 | 32,000 |
| Moreton Colliery | Salop | 400 | 50 | 20,000 |
| Nantmelin Colliery | Glamorgan | 120 | 100 | 12,000 |
| National Steam Coal | — | 300 | 500 | 150,000 |
| New British Iron | — | 20,000 | 30 | 600,000 |
| Swansea Anthracite Colliery | Glamorgan | 2,000 | 10 | 20,000 |
| Tees Hetton Coal | Durham | 30 | 100 | 30,000 |
| Trafalgar Colliery | Gloucester | 6,600 | 10 | 66,000 |
| Wylam Coal | Northumberland | 1,200 | 1 | 1,200 |
| | Total | | | £1,365,700 |

### SLATE AND STONE.

| | | | | |
|---|---|---|---|---|
| Abercorris Slate and Slab | Merioneth | 30,000 | 1 | £30,000 |
| Bwlch-y-Slater Quarry | ditto | 5,000 | 10 | 5,000 |
| Capel Curig Slate | Carnarvon | 2,000 | 10 | 20,000 |
| Carnarvonshire United Granite | ditto | 15,000 | 1 | 15,000 |
| Elterwater Green Slate | Westmoreland | 2,000 | 5 | 10,000 |
| Manystones Quarry | — | 60,000 | 1 | 60,000 |
| Pencoylan Slate and Slab | Brecon | 10,000 | 5 | 50,000 |
| Pant Glas Slate and Slab | Denbigh | 50,000 | 1 | 50,000 |
| Ruabon Stone | ditto | 1,000 | 10 | 10,000 |
| Sealyham Slate | Pembroke | 4,000 | 5 | 20,000 |
| Troutbeck Park Green Slate | Westmoreland | 2,000 | 5 | 10,000 |
| United Welsh Slate | Pembroke | 25,000 | 2 | 50,000 |
| Victoria Slate Quarry | Carnarvon | 2,000 | 5 | 10,000 |
| West of England Slate | Devon | 100,000 | 1 | 100,000 |
| Whitland Abbey Slate | Carmarthen | 2,500 | 10 | 25,000 |
| | Total | | | £510,000 |

### FOREIGN.—EUROPE.

| | | | | |
|---|---|---|---|---|
| Barancannes Copper | Portugal | 120,000 | 1 | £120,000 |
| Bidasoa Railway and Mines | Spain | 1,000 | 20 | 20,000 |
| Dicido Iron Ore | ditto | 10,200 | 10 | 102,000 |
| Helligenberg Coal and Brick | Prussia | 30,000 | 1 | 30,000 |
| Iron Ore Company | Spain | 30,000 | 1 | 30,000 |
| Lolita and Mejora Mines | ditto | 30,000 | 1 | 30,000 |
| Mestanza Mines | ditto | 3,000 | 10 | 30,000 |
| Nedemza Copper | Norway | 30,000 | 2 | 60,000 |
| Northern Mineral | ditto | 200 | 10 | 2,000 |
| Norway Phosphate | ditto | 10,000 | 10 | 100,000 |
| Oscar Gold | ditto | 75,000 | 1 | 75,000 |
| Rio Sil Mining | Spain | 350,000 | 1 | 350,000 |
| Spanish Copper Company | ditto | 15,000 | 10 | 150,000 |
| Treviso Calamine Mines | ditto | 25,000 | 1 | 25,000 |
| Triano Ore | ditto | 10,000 | 10 | 100,000 |
| Upper Lonhay Gold | Austro-Hungary | 50,000 | 1 | 50,000 |
| Vosges Silver, Copper, and Lead | France | 1,250 | 20 | 25,000 |
| | Total | | | £1,298,000 |

### ASIA.

| | | | | |
|---|---|---|---|---|
| Bengal Baragunda Copper | Bengal | 20,000 | 1 | £20,000 |
| Straits Tin Company | Straits Settlements | 10,000 | 10 | 100,000 |
| | Total | | | £120,000 |

### AFRICA.

| | | | | |
|---|---|---|---|---|
| Diamond Fields Collieries | Orange States | 24,000 | 5 | £120,000 |
| Graskop (Transvaal) Gold | Transvaal | 300,000 | 1 | 300,000 |
| Kit Fia Mines | West Coast | 20,000 | 1 | 20,000 |
| Lisbon-Berlyn (Transvaal) Gold | Transvaal | 500,000 | 1 | 500,000 |
| Spitzkop (Lydenburg) Gold | ditto | 200,000 | 1 | 200,000 |
| Wellington Mining | Cape | 250 | 20 | 5,000 |
| | Total | | | £1,145,000 |

### NORTH AMERICA.

| Title. | Situation. | No. of Shares. | Per Share. | Nominal Capital. |
|---|---|---|---|---|
| Acadian Gold Mining | Nova Scotia | 30,000 | 1 | £30,000 |
| Agnes Mining | Colorado | 2,000 | 10 | 20,000 |
| Anglo-Mexican | Mexico | 65,000 / 325 | 5 / 1 | 325,325 |
| Argenta Falls Silver | Colorado | 150,000 | 1 | 150,000 |
| Clear Creek Mining | ditto | 2,000 | 1 | 2,000 |
| Cliff Silver Mines | Newfoundland | 40,000 | 5 | 200,000 |
| Czar Silver and Galena | Colorado | 75,000 | 1 | 75,000 |
| Dayton Coal and Iron | Tennessee | 500 | 500 | 250,000 |
| Georgia Gold | Georgia | 40,000 | 10 | 400,000 |
| Gilpin County Consolidated | Colorado | 50,000 | 1 | 50,000 |
| Gladstone Smelting & Mining | ditto | 150,000 | 1 | 150,000 |
| Gold Extraction Company | United States | 100 | 10 | 1,000 |
| Honduras Mines Syndicate | Honduras | 2,000 | 1 | 2,000 |
| Kent County Gold | Colorado | 120,000 | 1 | 120,000 |
| La Plata Mining and Smelting | United States | 400,000 | 1 | 400,000 |
| London and New Mexico | ditto | 1,000 | 1 | 1,000 |
| Mackay and Resolution Silver | Utah | 150,000 | 1 | 50,000 |
| Michipicoten Copper | British Possession | 100,000 | 1 | 100,000 |
| Monarch Copper | Wyoming | 75,000 | 1 | 75,000 |
| Montezuma Silver | Mexico | 240,000 | 1 | 240,000 |
| Montana Company | Montana | 300,000 | 2 | 600,000 |
| Olancho Syndicate | Honduras | 2,000 | 1 | 2,000 |
| Ottawa Iron and Steel | United States | 70,000 | 5 | 350,000 |
| Ouray Consolidated Silver | Colorado | 250,000 | 1 | 250,000 |
| Santa Rita | Mexico | 720 | 100 | 72,000 |
| Sierra County Gold | California | 750 | 10 | 7,500 |
| Simmons Consolidated Gold | Colorado | 100,000 | 1 | 100,000 |
| Twin Lakes (Hydraulic) Gold | ditto | 1,000 | 50 | 50,000 |
| Vesuvius Gold | ditto | 50,000 | 1 | 50,000 |
| Victorine Gold Mining New Co. | Nevada | 150,000 | 1 | 150,000 |
| Washington Hill Gold Gravel | California | 100,000 | 1 | 100,000 |
| | Total | | | £4,472,825 |

### SOUTH AMERICA.

| | | | | |
|---|---|---|---|---|
| Allanza de Cicapra Gold | Venezuela | 401,007 | 1 | £401,007 |
| Cabacal Company | Brazil | 2,000 | 5 | 10,000 |
| Central Callao Gold | Venezuela | 20,000 | 1 | 20,000 |
| Colombian Mines Corporation | Colombia | 30,000 | 1 | 30,000 |
| Don Pedro Gold | Brazil | 125,000 | 1 | 125,000 |
| Esmeralda Emerald Mines | Colombia | 100,000 | 1 | 100,000 |
| Liverpool Nitrate Company | Tarapaca | 6,000 | 25 | 150,000 |
| Minas Geraes Gold | Brazil | 600,000 | 1 | 600,000 |
| Nacupai Gold | Venezuela | 583,000 / 20,000 | 1 / 5 | 683,000 |
| New Cicapra and Mercedes Gold | ditto | 250,000 | 1 | 250,000 |
| Quebrada Railway, Land, & Cop. | ditto | 100,000 | 10 | 1,000,000 |
| Reforma Gold | Colombia | 6,000 | 1 | 6,000 |
| San Rafael Consolidated | Costa Rica | 200,000 | 2 | 400,000 |
| Venezuelan Copper | Venezuela | 500,000 | 1 | 500,000 |
| West Argentine Gold | Argentine Republic | 50,000 | 1 | 50,000 |
| | Total | | | £4,245,007 |

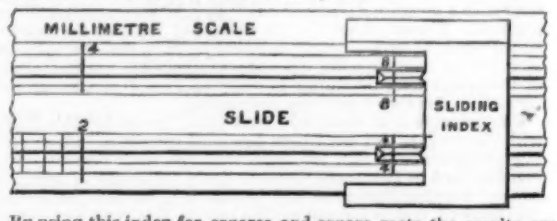
### SUMMARY.

| | | |
|---|---|---|
| **BRITISH.** | | |
| 42 | Metalliferous Mines | £1,554,866 |
| 23 | Coal and Iron | 1,365,700 |
| 15 | Quarries, Slate, Stone | 510,000 |
| 80 | Total | £3,430,566 |
| **FOREIGN.** | | |
| 65 | Metalliferous Mines | £10,328,832 |
| 6 | Miscellaneous Mines | 953,000 |
| 71 | Total | £11,281,832 |
| | Grand total, 151 companies, nominal capital | £14,712,398 |

## GRAVETS' CALCULATING RULES.

The antiquity of mechanical aids to arithmetical computations is probably as great as that of the computations themselves; indeed, the very word calculation is derived from calculus, a pebble, and it is explained that the name was given because it is supposed that when the number to be computed exceeded that represented by the fingers of the two hands, which gives us the basis of the decimal system, resort was had to pebbles to remove the otherwise insurmountable difficulty. The second step must have been the utilisation of a single pebble to represent a group, perhaps 10, and ultimately by varying the size or colours of the pebbles even groups of groups could be represented, and thus units, tens, hundreds, and so on could be dealt with mechanically. Improvements have from time to time been made, and various schemes tried, only to be abandoned.

It will readily be understood that in a delicate instrument of this kind everything depends upon the precision of its manufacture, and in the Gravets' calculating rule, one of which can be seen at the *Mining Journal* Office, it is evident that all the modern resources for securing accuracy have been turned to good account. Gravets' Slide Rule (the agent for which in this country is Mr. Farrar, of Glover-street, Leeds) is made in various lengths, but the one most generally used is 26 centimetres long, or nearly 10¼ in; 36 centimetres is more suitable for the desk. Its face is divided somewhat in the manner of an ordinary slide-rule, there being two scales on the rule itself and two on the slide. To simplify matters let these be called A, B, C, and D respectively. We shall then have A and B identical ranging from 1 to 100, and also C and D identical with each other ranging from 1 to 10. A and B are, therefore, the squares of numbers on C and D. A sliding index embraces the rule, and marks results on all four lines at one and the same time, thus—




By using this index for squares and square roots the results are obtained instantly. For cube roots the slide is reversed. The sliding index enables us to work out formula of any length without having resourse to any pencil or even straining one's memory as is the case with other slide-rules. For example—

$$\frac{15 \times 4^2 \times 2{\cdot}75}{3 \times 7{\cdot}5 \times 3{\cdot}7^2} = 2{\cdot}1428 \text{ nearly.}$$

Here we mark 15 on A, and place 5 on B under it; we then move index to 4 on C (which is equal to $4^2$.) We then bring 7·5 on B under the index, and move the latter to 2·75 on B. Under this we bring 3·7 on C, and over 1 on B we read 2·1428 (nearly) the answer on A.

We have only two settings of the slide in the above, as the "index" plays the most important part, and it will at once be seen that the equation might be extended indefinitely, and yet the final result as marked off with the index would be bound to be right if care had been taken to mark each result accurately. This is a thing which cannot be pressed to much upon those using the rule, because while we are all anxious to do our work in the least possible time we wish also to do it without any severe mental strain, and this rule certainly supplies the means. The back of the slide is divided for tangents, sines, and logarithms respectively, each of which may be worked with rule in its natural position.

The rule has a recess at each end, which are used as indices when working out trigonometrical questions, or when logarithms are employed. If we require the tangent of any angle we have but to bring the degrees on scale T opposite its own index in the recess, and over 1 on B on the front of the rule we have the desired result. For example, we bring 20 on scale T opposite the index in the recess, and over 1 on line B we read 3639 the tangent on A. Sines are obtained in a similar way, using the index in the recess at the opposite end of the rule. Logarithms are obtained by placing the 1 on line C over the numbers on D, and opposite the index in the right hand recess we find the decimal part of the logarithm. For example, we want the logarithm of 20. Over 20 on D place 1 on C, and opposite the index we have ·301, which is the decimal part of the logarithm. The answer is of course 1·301. It will at once be seen that the most complicated questions involving trigonometrical and algebraical quantities can be reduced to a mere mechanical performance without the least difficulty. The above outline sketch of a portion of the rule will give a general idea of its arrangement, and it may be said, in conclusion, that for all engineering professions, &c., this rule is admirably adapted, and can with confidence be generally recommended.

## PRACTICAL MINING—VALUATION OF COPPER ORE, AND PAYMENT OF TRIBUTERS.—No. I.

The progress made in connection with the metallurgy of copper having enabled the smelters considerably to modify the details of the smelting process so as to adapt it to the treatment of copper ore of any given produce the principle of determining the relative value of ores of different produce has entirely changed, and consequently tables of variations which half a century ago were quite reliable have become obsolete and worthless. At present a relatively higher price is given for low produce ore than formerly, whilst high produce ore commands a relatively lower price, because it has been found that although in low produce ore each ton of metal is contained in a larger number of tons of ore, this difference only affects the preliminary stage of the smelting process, and that a certain point being reached all subsequent outlay in preparing the metal for the market is the same, whether the partially manufactured copper has been obtained from poor ore or from rich. It was at first intended merely to calculate a new variation table adapted to the practice of the present time, but it was found that even with the best constructed tables there was such an enormous waste of time in obtaining any result sought for, that it was preferable thoroughly to explain the whole system of calculation, and to provide the necessary tables for permitting every question connected with the price of copper ore to be answered with the utmost possible facility. Further, it was thought desirable, as it involved but little explanation, to supply tables and rules for calculating price of materials, value of work done, interest, discount, commission, exchanges, metric weights and measures, and so on, thus meeting the wants of all, whether copper miners or others.

It need scarcely be remarked that in ordinary commercial transactions an arrangement which satisfied the immediate buyer and the immediate seller leaves little to be desired; but when a parcel of copper ore is sold to a smelter the case is somewhat different, for it often happens that after the price to be paid by the purchaser is settled the proceeds have to be distributed according to a fixed principle amongst the several persons entitled to them. Nor is this distribution of proceeds analogous to the payment of artizans, where for every given piece of work a fixed price is paid, because the ore got by several tributers is frequently mixed and sold in one parcel, although each miner is to be paid according to the intrinsic value of the mineral which he contributes to the mixed parcel. The consequence is that a proportional method of calculation has to be adopted in order to determine the relative value of ores of varying produce (or richness) when the market price for the day for ore of any one produce is known.

When the Cornish miners disposed of their ores by private contract it is probable that the bargains both between the tributers and the agent of the adventurers, and between the agent and the smelter, were made in a very arbitrary manner, much as a heap of halvans would be sold at the present day; but when copper smelting became an established industry a more systematic mode of estimation was naturally introduced. At present samples of the ore to be sold are carefully taken by the smelters' agents a fortnight before the day of sale; samples of 1½ lb. each are sent to each smelter, and the smelters' assayers test the produce of each sample. The assayers employed by the principal smelting firms meet in the interval between the sampling day and the ticketing day to compare the results of their assays, and at this meeting they agree upon a "settled list" of produces upon which the bidding may be based when the ticketing takes place. The sole advantage of possessing a knowledge of the "settled list" seems to be that, should any great discrepancy occur in the assays, each assayer has an opportunity of testing the accuracy of his results, for it is evident that at the ticketing the smelters do not bid strictly upon the "settled list,' since there will frequently be as much as 10s. per ton of ore difference in the bids made for the same parcel of ore by two members of the association, and this, even with an ore of 10 produce, would represent a difference of 5*l.* per ton in the market price of tough cake copper.

The history of the circumstances which led to the sale of copper ores at public ticketings is by no means uninteresting, especially as it affords a striking instance of the progress which has been made by miners in obtaining the best prices for their mineral, and thus making copper mining sufficiently profitable to secure the aid of capitalists to furnish means for its development It appears from Pryse's "Mineralogia Cornubiensis" that at the close of the 17th century good copper ore was sold to a Bristol smelter at from 2*l.* 10s. to 4*l.* per ton; and even in 1720 copper ore was so far unmarketable that the smelters were enabled to make contracts with some of the principal miners of Cornwall for long terms of years at ridiculously low prices, the lower produce ore being apparently altogether unsaleable. For 10 years later, in 1730, a Welsh smelter purchased for cash, at 6*l.* 5s. per ton, 1400 tons of copper ore, which had been lying unsold during some years, and for which previously only 4*l.* 10s. per ton had been offered; and that the Welshman did not overpay for his ore is pretty evident, for his first six months' operations, in which period he purchased about 20,000*l.* worth of ore at prices which were at that time considered enormously high, gave him about 40 per cent. profit. It was this circumstance which really led to the establishment of ticketings. The miners not unnaturally concluded that, as a rule, they did not obtain their fair share of profit, and it was ultimately agreed that the smelters should periodically tender for whatever ores the miners might have for sale. These periodical sales were conducted by a representative of the miners, and as the assembled smelters' agents made their bids, or rather tendered, in writing on small pieces of paper or tickets the sales received the name of "ticketings." When all the tickets had been handed in the prices offered by each smelter were read aloud by the miners' representative, and the highest bidder was declared the purchaser.

As the various parcels of ore offered for sale by the miners of course differed in the percentage of metallic copper which they contained, and as the smelter naturally valued the ore according to the metallic copper he could extract from it, a basis of calculation was necessary to prevent disputes, and the value of 1 ton of metallic copper, with the addition of the estimated cost (including smelters' profits) was taken at this basis and called the standard, so that, originally, the "standard" and the "market price of tough cake" copper were almost synonymous; thus, if tough cake copper were selling at 110*l.* per ton in the market the standard would be 110*l.*, and the smelter would pay the mine 110*l.*, less the "returning charges" (that is, the estimate cost of extracting the metal from the ore, plus the smelter's profits), and as all ores were dressed up to an almost uniform produce of from 9 to 12 per cent. the "returning charges" were likewise assumed to be uniform, and to be equal to 2*l.* 15s. for each ton of ore smelted. The consequence of this was that if the miner sold to the smelter a sufficient quantity (10 tons) of ore of 10 produce to yield 1 ton of metallic copper he received ten times 2*l.* 15s. = 27*l.* 10s. less than the 110*l.* for the parcel, this leaves him 82*l.* for the parcel, or 8*l.* 5s. per ton of ore.

But if the miner sold to the smelter a sufficient quantity (8½ tons) of ore of 12 produce, to yield 1 ton of metallic copper, he received 8½ times 2*l.* 15s. = 22*l.* 18s. 4d. less than the 110*l.* for the parcel; this leaves him 87*l.* 1s. 8d. for the parcel, or 8*l.* 14s. 2d. per ton of ore. For some time this arrangement gave every satisfaction, until Mr. Vivian (whose descendants are still amongst the largest copper smelting firms) discovered that the returning charges being uniformly 2*l.* 15s. per ton of ore, it took a much smaller proportion of the 2*l.* 15s. to smelt a ton of low produce ore than to smelt a ton of high produce ore. Now, as Dr. Percy remarks, "the simple mode of meeting this was to have had a varying scale of returning charges, instead of which these charges remained the same, while the standard was varied with the varying produce of the ores, so that with copper at 120*l.* there might be a standard of 115*l.* or 130*l.*, and thus the word standard lost its former simple and correct meaning. Competition went on increasing, processes were improved, carriage, freights, coals, &c., were lowered, but the returning charge continued the same, with, of course, less applicability than ever to the varying produce of the ores."

Even at the present day the standard is announced in connection with every public ticketing, whether in Cornwall or at Swansea, although, curiously enough, the standard that has been given is calculated after the sale, instead of the standard that shall be given being fixed before the sale. The reason of this is very clearly explained by Dr. Percy in the same page from which we have just quoted. "The smelter has no longer got his standard price of copper arranged with the miner as of old, but he opens his eyes to all the circumstances, or ought to do; he sees what sort of ore he wants, he knows the rate of carriage and freight which he will have to incur on each parcel; he knows that one lot melts easily, another with difficulty; a third makes good copper, a fourth bad, and so on;" and he fixes his price for each parcel accordingly. "Immediately," he continues, "these prices are disclosed in the sale-room the miners' and smelters' clerks proceed to calculate the standard in the following manner:—

| | | | |
|---|---|---|---|
| Price of ore of 5 per cent. produce ..... | £4 | 12 | 0 |
| Add returning charges..... | 2 | 15 | 0 |
| Total ..... | £7 | 7 | 0 |

But this sum refers to the ton of ore, or 5 per cent. of the ton of copper, so that the standard of the ton of copper will be 7*l.* 7s. × 20=147*l.* Again:—

| | | | |
|---|---|---|---|
| Price of ore of 20 per cent, produce ..... | £21 | 15 | 0 |
| Add returning charges ..... | 2 | 15 | 0 |
| Total ..... | £24 | 10 | 0 |

This multiplied by 5 gives the standard 122*l.* 10s. Hence the standard is now deduced from the price and not the price from the standard as formerly. The buyer makes his offer without thinking of the standard. When the sale is over the average produce of all the parcels of ore is determined, and also the average standard. . . . The only purpose which this modern standard serves is already mode of comparison of prices, or of rates, at which copper in the ore has been sold. For instance, instead of saying last week ores of 5 per cent. produced sold for such a sum, and this week they sold for such a sum, the phrase is, the standard is down a couple of pounds, or up 5*l.*, as the case may be.

Now, as each parcel of ore is purchased by the smelter on its own merits, it is essential (when ore got by several tributers has been mixed together to make up the quantity) that the distribution of the proceeds should be made in consideration only of the amount actually realised for that particular parcel, and not in consideration of the average standard of the day. It must first be calculated how much the smelter has paid per ton of fine copper in the ore (including the estimated cost of smelting it), and when the real standard is thus ascertained the price to which each tributer is entitled must be deduced therefrom. The mode of operation will be most readily understood from a sketch of the mode of dealing with an imaginary mixed parcel standing in the doles ready for the sampler, the percentage of moisture in each tributer's ore having been already ascertained so that the "dry weight" is known. John Penrose's ore weighs 3 tons 14 cwts. 1 qr. dry weight, and is of 8 produce; Thos Bugle-hole's ore weighs 16 tons 2 cwts. 3 qrs., and is of 5½ produce; Wm. Mitchell's ore weighs 21 tons 8 cwts. 2 qrs., and is of 7¼ produce; John Thomas's ore weighs 5 tons, and is of 7½ produce; and Henry Williams's ore weighs 10 tons 6 cwts., and is of 6½ produce. The whole parcel, weighing 56 tons 10 cwts. 2 qrs. in all, is purchased by the smelter at 4*l.* 3s. 6d. per 21 cwts., which gives 235*l.* 17s. 9d. for the parcel.

As we do not know that the smelter has made this particular bid at a price corresponding to the average standard of the day, it will be useless to attempt to distribute fairly this 235*l.* 17s. 9d. amongst the five tributers on the basis of the average standard; but we must see for how much "copper in the ore" the smelter has paid 235*l.* 17s. 9d., and then make the distribution accordingly. If we make the necessary calculations for ascertaining this fact (and the results can be obtained much more quickly by multiplication than by "ready reckoning" tables and addition), we shall get a statement somewhat thus:—

| No. | Tons | cwt. | qrs. | Produce. | Fine copper. |
|---|---|---|---|---|---|
| 1 ..... | 3 | 14 | 1 | ..... 8 ..... | ·2949 |
| 2 ..... | 16 | 2 | 3 | ..... 5½ ..... | ·8872 |
| 3 ..... | 21 | 8 | 2 | ..... 7¼ ..... | 1·5518 |
| 4 ..... | 5 | 0 | 0 | ..... 7½ ..... | ·3750 |
| 5 ..... | 10 | 6 | 0 | ..... 6½ ..... | ·6686 |
| Parcel. | 56 | 10 | 2 | | 3·7769 |

And 3·7769 tons of fine copper in 56 tons 10 cwts. 2 qrs. of ore gives about 6 11-16 as the produce of the parcel. Then, the smelter having paid 4*l.* 3s. 6d. per 21 cwts. for the ore, we divide 4*l.* 3s. 6d. by 6 11-16, and find that the smelter has valued the copper in the ore at 12s. 6d. per unit, and, therefore, that he has given 62*l.* 10s. per ton of "copper in the ore," and if to this 62*l.* 10s. we add the estimated cost of extracting 1 ton of copper from ore of 6 11-16 produce, we shall obtain the real standard at which the parcel has been purchased. With this real standard as a basis we can readily find the value of the ore (in the same parcel) of the several produces which have been mixed to make up the average produce of 6 11-16. The process being here explained in writing may appear somewhat complicated, yet it is really almost identical with that which is commonly followed in settling for any parcel of mixed ore. It may, however, be desirable to explain the method by which the fine copper in each tributer's ore is readily ascertained by the use of the tables.

It will be scarcely necessary to remind the miner that in arithmetic the figure *by* which we multiply is called the "multiplier," the figure which we multiply is called the "multiplicand," and the result obtained is called the "product."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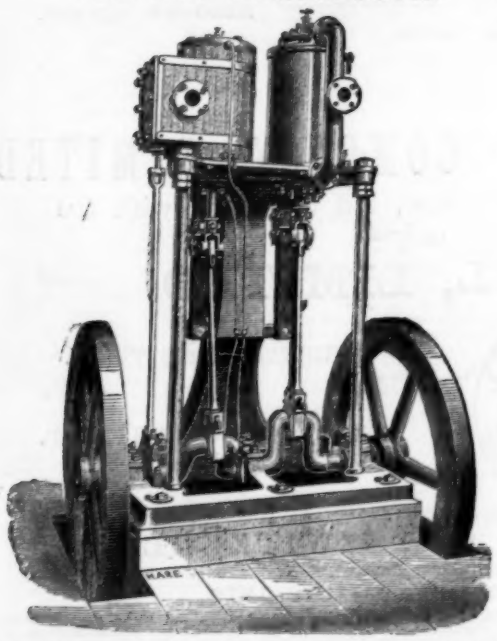

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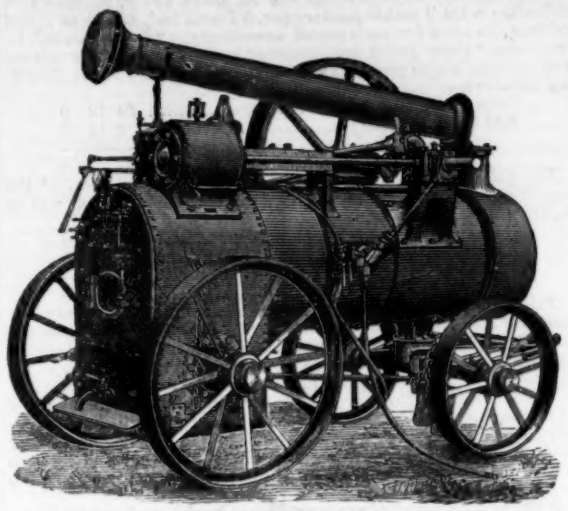

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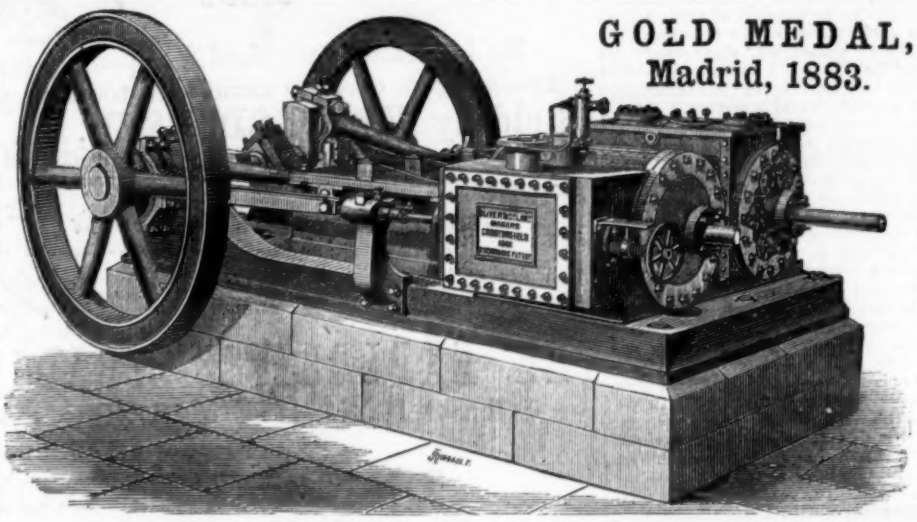

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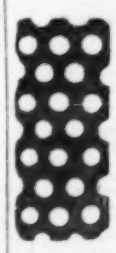

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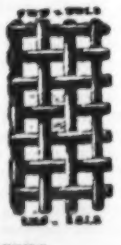

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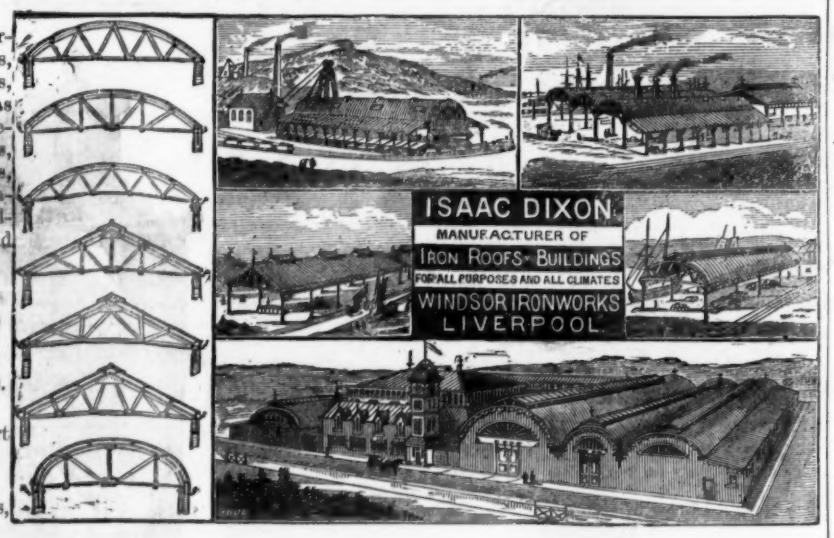


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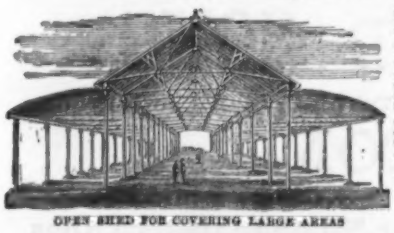

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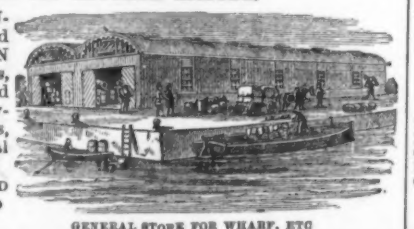

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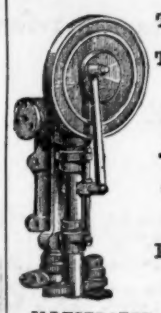

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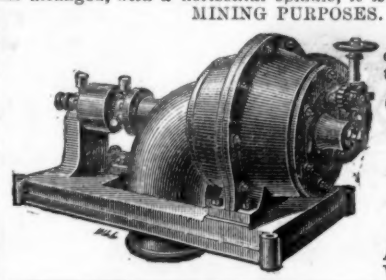

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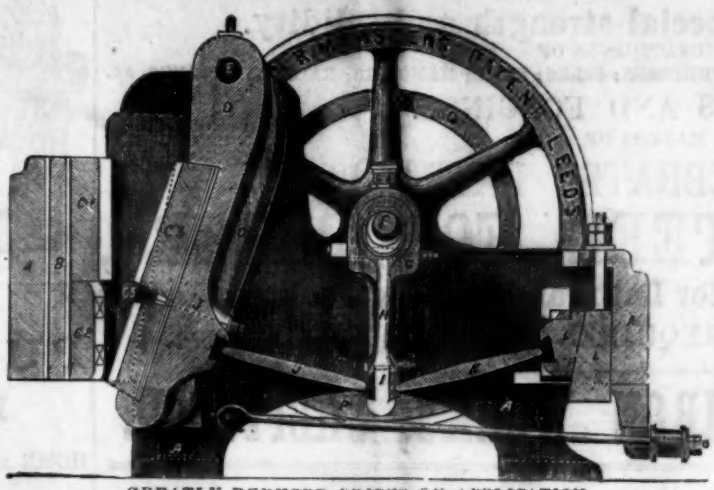

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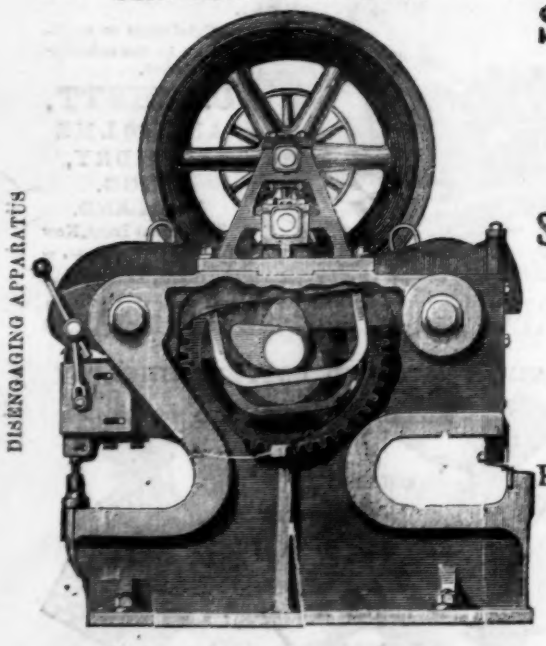

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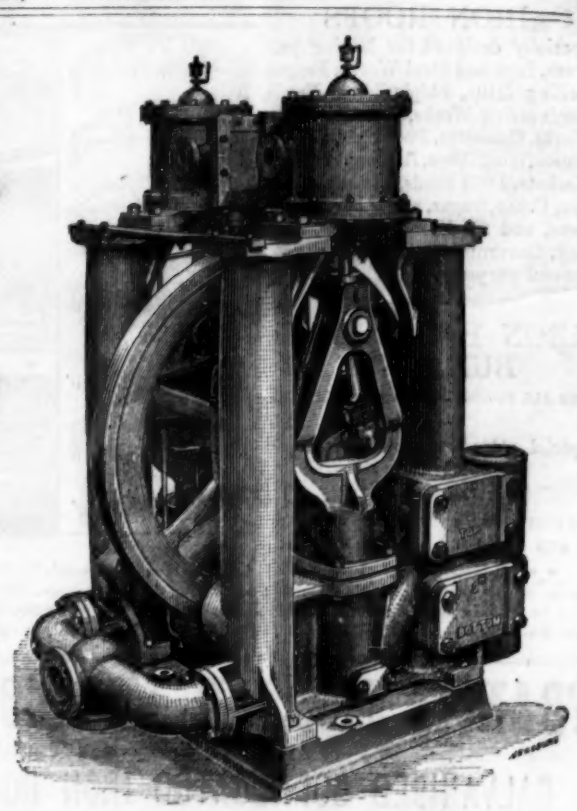

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